SHIPS AND SILVER, TAXES AND TRIBUTE

A FISCAL HISTORY OF ARCHAIC ATHENS

HANS VAN WEES

I.B. TAURIS

Hans van Wees is Grote Professor of Ancient History at University College London. His books include *Greek Warfare: Myth and realities*; *The Cambridge History of Greek and Roman Warfare* (two volumes, edited with Philip Sabin and Michael Whitby); *Archaic Greece: New approaches and new evidence* (edited with Nick Fisher); *War and Violence in Ancient Greece* and *A Companion to Archaic Greece* (edited with Kurt A. Raaflaub).

'With this important book Hans van Wees is the first historian systematically to approach ancient Greek economy and society along the lines of the "new fiscal history". The results are highly rewarding, and go far beyond the area of public finance. In addition to a fresh perspective on key aspects of the archaic Greek world, the author provides numerous insights into the elusive process of state formation in Athens and elsewhere.'

Paul Millett, Senior Lecturer in Classics, University of Cambridge, author of *Lending and Borrowing in Ancient Athens*

'Hans van Wees, in this groundbreaking study, demonstrates that already from the time of Solon at the beginning of the sixth century BC, Athens was indeed a state and did have public finances and financial institutions. Themistocles' navy and the Delian League with its tribute were not startling novelties but were built on foundations laid in the previous century. This is an impressive *tour de force* of scholarship and imagination which joins up the dots of our evidence to produce a coherent and credible picture of Athens' growing financial needs and responses to them. It adds an important further dimension to the accounts of Athens' development given elsewhere.'

P.J. Rhodes, FBA, Emeritus Professor of Ancient History, University of Durham, author of *A History of the Classical Greek World 478–323 BC*

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Acknowledgements

In writing the conclusion to my previous book, I found myself arguing that if archaic Greek warfare seemed restrained by comparison to the Peloponnesian War, this was not because early Greeks were inhibited by the chivalrous ideals of an 'agonal' culture but because they lacked the central organization and above all the financial resources to do as much damage to their enemies as they would have liked. The sketch of the rise of the State and public finance which I offered in that context was quite rough, not least because there was rather little scholarly work to draw on. A logical next step was therefore to investigate the history of archaic public finance in more detail, which in view of the limited sources and scholarship on the subject seemed a small project which might result in a modest academic paper. As it turned out, the ancient evidence could be made to yield much more information than scholars had so far been able – or indeed willing – to extract, but only at the expense of letting what was intended to be at most a long article grow into a short monograph.

This book has benefited greatly from comments offered by audiences at lectures, seminars and conferences where I presented related papers. The advice of Simon Hornblower, Michael Crawford and Riet van Bremen, my (former) colleagues at UCL, was particularly helpful. The core of the material was presented as a paper in a seminar series on 'public finance in antiquity', hosted and funded by the *Institute of Classical Studies* in London, and convened by myself in 2008. Two of the other speakers in this series, Peter Rhodes and Peter Fawcett, subsequently read and commented on a complete draft manuscript, as did Peter van Alfen. Rhodes' own paper on classical Athenian public finance will appear in *Greece and Rome*, and Fawcett's study of classical Athenian

taxation should also be published in the near future. The three Peters saved me from more errors and oversights than I care to mention and they stimulated a good deal of further research and re-interpretation. Finally, Alex Wright and Amy Himsworth of I.B.Tauris were extremely efficient and encouraging in helping me turn my text into a book at short notice. To all of the above I am very grateful.

Abbreviations

For the conventional abbreviations of names of ancient authors and titles of ancient works used in this book, see the list in the *Oxford Classical Dictionary.*

BCH	*Bulletin de Correspondance Hellénique*
CEG	P.A. Hansen, *Carmina epigraphica Graeca: saeculorum VIII-V a.Chr.* (Berlin and New York, 1983)
CH	*Coin Hoards*
dr	drachma
F/fr.	fragment
FGrH	F. Jacoby, *Die Fragmente der griechischen Historiker* (Berlin and Leiden, 1923–)
FHG	K. Müller, *Fragmenta historicorum graecorum* (Paris, 1841–70)
Fornara	C.W. Fornara, *Archaic Times to the End of the Peloponnesian War*. Second edition (Cambridge, 1983)
GIBM	*The Collection of Ancient Greek Inscriptions in the British Museum* (Oxford, 1874–1916)
I.Ephesos	H. Wankel et al., *Die Inschriften von Ephesos* (Bonn, 1979–84)
I.Priene	F. Hiller von Gaertringen, *Inschriften von Priene* (Berlin, 1906)
IC	M. Guarducci, ed., *Inscriptiones Creticae* (Rome, 1935–50)
ICS	O. Masson, *Les inscriptions Chypriotes syllabiques* (Paris, 1983)
IG	*Inscriptiones Graecae* (Berlin, 1873–)

IGCH	M. Thompson et al., *An Inventory of Greek Coin Hoards* (New York, 1973)
IvO	W. Dittenberger and K. Purgold, *Die Inschriften von Olympia*, in E. Curtius, ed., *Olympia*, vol. V (Berlin, 1896)
LBA	Late Bronze Age
L-P	E. Lobel and D.L. Page, *Poetarum Lesbiorum Fragmenta* (Oxford, 1955)
LSAG	L.H. Jeffery, *Local Scripts of Archaic Greece.* Second edition, revised edition by A.W. Johnston (Oxford, 1990)
ML	R. Meiggs and D.M. Lewis, *A Selection of Greek Historical Inscriptions to the End of the Fifth Century*. Revised edition (Oxford, 1988)
Nomima	H. van Effenterre and F. Ruzé, *Nomima*, vol. 1 (Rome, 1994)
Nomima II	H. van Effenterre and F. Ruzé, *Nomima*, vol. 2 (Rome, 1995)
ob.	obol
R	E. Ruschenbusch, *Solōnos Nomoi: die Fragmente des Solonischen Gesetzeswerkes* (Wiesbaden, 1966)
RO	P.J. Rhodes and R. Osborne, *Greek Historical Inscriptions 404–323 BC* (Oxford, 2003)
Rose	V. Rose, *Aristoteles Fragmenta* (Stuttgart, 1966)
SEG	*Supplementum Epigraphicum Graecum*
SGDI	H. Collitz and F. Bechtel, *Sammlung der griechischen Dialekt-Inschriften* (Göttingen, 1885–1915)
tal.	talent
Wehrli	F. Wehrli, *Die Schule des Aristoteles: Texte und Kommentare* (Basel and Stuttgart, 1967–9)

1 A Fiscal History of Archaic Athens: Why and How?

Ancient Athens' most under-appreciated achievement is the sheer scale and sophistication of its system of public finance. In one peak period, the city's chief treasurer Lycurgus is said to have spent 18,650 talents over twelve years (336–324 BC), an average of about 40 tonnes of silver a year, for a total population of about 250,000, or 160 grammes per head. In relative terms, this exceeds the annual expenditures of France during the Napoleonic Wars, which at its peak amounted to 3,600 tonnes of silver for a population of 30 million, or 120 grammes per head. No modern European state exceeded Athens' financial performance before Britain in the Industrial Revolution made a quantum leap to another level.[1] The figures are all the more impressive if we take into consideration that Athens' large budget was supplemented by devolving a sizeable part of the city's military and religious expenditure onto wealthy private individuals who were required to perform so-called 'liturgies'.

Moreover, at least two features of classical Athenian public finance are otherwise associated only with the most modern fiscal regimes. First, taxation was 'progressive', since property taxes were levied only upon the richest of citizens. Secondly, expenditure involved a remarkably generous redistribution of wealth, since the treasury paid all citizens wages for fulfilling their military, political and ritual duties, which became a major source of income for the poorest families. In the 350s BC, Xenophon's pamphlet *Ways and Means* went so far as to advocate that the city should aim to generate enough revenue from taxes, duties and public assets to provide a subsistence income of 3 obols of silver per day for every single citizen family.[2]

How and when did this extraordinary system of finance, which paid for Athens' democratic government, famous military victories and stunning public architecture, come into being? Many scholars believe that it was created in the classical period (*c.* 480–320 BC), and that as late as the 480s BC Athens had had almost no public funds. Indeed, it is thought that before 500 BC Athens' governmental organization had been barely worth the name 'State', and that in the preceding centuries the city's economy had produced hardly any surplus which could have contributed to public funds controlled by the State – if there had been any such thing. The consensus is that later developments were made possible by a lucky strike in Athens' silver mines in 483 BC, the proceeds of which were unprecedentedly put to public use by funding the construction of a war fleet, which in turn made Athens an international power with previously inconceivable streams of imperial revenue. On this common view, the Athenian state and its system of public finance were created almost at a stroke, along with the navy, the empire and radical democracy.[3]

The story is dramatic and appealing, but history it is not. This book will show that the roots of Athens' public finance lay much further back, in the archaic age (*c.* 700–480). Athens did not transform itself in and after 483 BC but merely expanded a navy-centred system of public finance that had already existed for at least a generation and had forerunners another century earlier. A detailed reconstruction of the scattered and often obscure evidence for all aspects of public finance – administrative institutions, expenditures, revenues and financial media – will reveal that a complex machinery of public funding and spending was in place from at least the time of Solon's reforms in 594 BC and steadily became still more sophisticated throughout the turbulent sixth and early fifth centuries. Public finance will emerge as the most highly developed part of the Athenian apparatus of government, and indeed as a driving force in the rise of the State itself. Without it, the new revenues from silver mines and imperial tribute might never have come into being, or would at any rate not have been put to public use with such momentous historical consequences.

Whereas classical Athenian public finance has been relatively well studied, the financial dimension of archaic Athenian history

has never yet been investigated systematically or in any detail. One simple reason may be that the activities of figures such as Solon and Cleisthenes as tax-reformers and architects of financial institutions seem mundane compared to their role as founding fathers of democracy. But even if taxation is as widely disliked as democracy is cherished, we can hardly ignore the immense importance of public finance – never more obvious than when it falls short or fails, as it has done so spectacularly in recent years. A 'new fiscal history' which treats public finance as a matter of primary historical importance and a potential driver of major change has emerged since the 1980s, but historians of ancient Greece have not yet taken up the baton.[4] The major work of reference on public finance remains August Boeckh's monumental *Die Staathaushaltung der Athener* (1817), which has been superseded only by its own second and third editions (1850, 1886), and like almost all subsequent scholarship, discussed barely any archaic evidence.[5]

Before we can embark on our new reconstruction of archaic Athenian public finance, however, we must address the standard objections that no such thing could have existed because (a) our sources imply that it did not; (b) the archaic city was not a 'State' and could not have had a system of public finance; and (c) the archaic economy was too simple to have produced significant surplus resources for public use.

PUBLIC FINANCE AND THE LEGEND OF THEMISTOCLES

The greatest single influence on modern ideas about the development of Athenian public finance and the Athenian state is the story of Themistocles' proposal in 483 BC to build a new fleet of triremes. According to Herodotus,

> when the Athenians, who had in their common treasury (ἐν τῷ κοινῷ) large funds which accrued to them from the mines at Laurion, were about to distribute ten drachmas each to all men, Themistocles persuaded them to halt this distribution and to build with these funds 200 ships for the war, meaning the war against Aegina. (7.144.1)

Since 200 was the total number of warships available to Athens three years later at Salamis, the picture which emerges from this episode is that Athens before 483 BC did not have a single trireme, perhaps no public fleet at all, and thus incurred none of the vast expenditure on the navy which subsequently came to dominate public finance. Later sources modify the story in significant ways, but the gist remains the same and forms the basis of most modern accounts, which argue that Themistocles' ship-building transformed Athenian public finance.[6]

Indeed, Herodotus' story suggests that Themistocles single-handedly invented the very *concept* of public finance, i.e. the principle that certain resources, manpower and communal revenue are allocated exclusively to the funding of collective and governmental activity. Before his intervention, the Athenians appear to lack such a concept, insofar as they treat surplus revenue as collective property to be distributed rather than as state property to be accumulated centrally and spent for the benefit of the community as a whole. Instead of 'public' finance they appear to rely on a system of 'communal' finance, in which collective activities are made possible by *ad hoc* voluntary contributions of manpower and resources by individual members of the community, and any gain from collective enterprises is shared out among them. If so, Themistocles' proposal would have been truly radical and visionary.

But we should be wary of accepting the story at face value, because Herodotus and his successors had their reasons to play down the level of Athens' development before the Persian Wars. Herodotus' *Histories* emphatically portrayed Greece in general and Athens in particular as poor and internally divided, so that the victory over the united forces of the colossally wealthy Persian empire represented the greatest imaginable reversal of fortune. The notion that the entire fleet which proved decisive in the Persian Wars was coincidentally built from scratch just a few years before Xerxes' invasion fitted Herodotus' narrative strategy perfectly.[7] Thucydides' brief account of the early history of Greece explicitly aimed to prove that the Peloponnesian War involved a far greater deployment of naval power and investment of public funding than any previous conflict: the claim that Athens had had only a few triremes before Themistocles served to support that

contention. Many later authors strongly disapproved of naval warfare, which they saw as the domain of the lower class, and thus had social and political reasons to suggest that in the good old days Athenian warfare had been strictly land-based until 'Themistocles took away the citizens' spear and shield, and consigned the Athenian people to the rowing cushion and the oar'.[8]

The realization that the main surviving ancient accounts are all, for different reasons, skewed in the same direction, should make us reconsider the substantial body of evidence which points another way but has been played down or dismissed as incompatible with the dominant literary tradition. We shall see that this other material, which derives in part from contemporary archaic evidence, in part from an alternative later tradition and in part from evidence for developments outside Athens, suggests that the transformation attributed to Themistocles' intervention had in fact been a gradual process that started at least a century earlier.[9] The naval programme of 483, and the creation of the Delian League in 478/7, undeniably had a great impact on Athens, but they involved a change only in the *scale* of public finance. The key structural changes had already taken place in the sixth century.[10]

PUBLIC FINANCE AND THE ATHENIAN STATE

Modern scholars have been quite happy to accept without question ancient claims that Athens had had no system of public finance until Themistocles invented it, because it fits well with a common notion that the archaic city had few institutions of government of any kind, and was insufficiently developed to deserve the name 'State'. Some would go so far as to argue that the same was still true of classical Athens. Whether this is so depends as much on one's definition of the term 'State' as on one's interpretation of the evidence. Either way modern definitions of the State take their cue from Max Weber's formulation:

> the modern State is an institutionalized form of government which has successfully attempted to monopolize the legitimate use of physical force as a means of domination within a territory and to this end unites the material instruments of government under the control of its head […][11]

From this starting point, two different schools of thought have developed. The first stresses the centralization of the means of physical coercion as the defining feature of the State, and traces its emergence in the creation of standing armies and navies, police forces, prison – and surveillance systems.[12] By that criterion, classical Athens was not a State, but may be characterized instead as 'an egalitarian stateless community' – and the same might be said of the countries of early modern Europe, which arguably allowed as much scope for the private use of force in self-defence and in the administration of justice as Athens did.[13]

Yet Weber clearly did not intend to give quite such a defining role to a centralized apparatus of coercion. First, his 'monopoly of legitimate physical force' did not necessarily entail the exclusive use of force by the personnel of the State, but merely the principle that the State had the power to determine what uses of private and collective force were legitimate. He explained 'that one ascribes the right to use physical force to other organizations and individuals only to the extent that the State gives them permission: the State is regarded as the sole source of the "right" to use force'.[14] By implication, the use of force could be delegated, and a community would strictly speaking need no central coercive power at all in order to qualify as a 'State', so long as it enjoyed theoretical control over the force used by its members. Indeed, Weber explicitly attributed a monopoly of legitimate force in this sense to pre-state forms of government as well.[15] Athens certainly did know this kind of theoretical monopoly: from Draco's homicide law onwards, at least, it had precise rules about legitimate and illegitimate uses of force, upheld by courts. Secondly, Weber described the process of state-formation as involving centralization not only of the means of coercion, but of all material sources of power, 'whether they consist of money, buildings, military materiel, fleets of vehicles, horses or whatever else'; in a modern State 'not a single official is any longer himself the owner of the money which he spends or of the buildings, supplies, tools, military hardware at his disposal' (1976: 823–4). In other words, centralized control over money – public finance – was for Weber as important a criterion of statehood as was central control over the means of physical coercion.

The second school of thought about state-formation therefore rightly abandons the preoccupation with physical force and emphasizes instead the first part of Weber's definition: the State is 'an *institutionalized* form of government'. In other words, power in a State is ascribed to institutions rather than derived from the personal qualities and resources of those who govern. The process of institutionalization is taken to apply not only to all 'material instruments' of government, but also to intangible sources of power, the various kinds of 'legitimate authority' which Weber discussed at length elsewhere.[16] This approach has been widely adopted by social anthropologists, who contrast state government with leadership by 'Big Men' and 'chiefs' relying to different degrees on personal merit and influence.[17] Institutional and personal powers and interests may of course coincide and reinforce one another, but the more sharply they are distinguished in theory and in practice, the more developed the concept and structure of the State. By this criterion, classical Athens, which could have done little more to separate public and private powers and interests, with its countless boards of magistrates selected by lot and subject to extensive scrutiny, was not merely a State, but a highly advanced kind of State.

The emphasis on centralized coercive power in so many modern studies derives from the peculiar nature of the large territorial states of medieval and early modern Europe, in which central government – the king and his court – had relatively few roles other than to wage war. Most other aspects of government, such as administering justice, securing a food supply and otherwise ensuring the welfare of the community, were in the hands of local authorities, which enjoyed a considerable degree of independence in such matters. The role of the 'State' was thus largely confined to extracting, if necessary by coercion, from local authorities and communities the manpower and money for the armies with which it coerced rival powers. Hence the main modern justification of the State, from Thomas Hobbes's *Leviathan* onwards, is that it is the only power capable of putting a stop to endemic private violence, while the main modern critique of the State is that it is no more than an instrument of coercion in the service of the ruling class. The process of state-formation was essentially a story of central government creating the coercive means by which to do so more effectively, and after 1700

taking centralization to the point of imposing 'direct rule' over regions and towns.[18]

By contrast, in city-states the process of state-formation by definition cannot follow this pattern, because central and local government coincide from the outset. The central authorities in city-states therefore have a range of responsibilities which goes well beyond warfare – although warfare is of course often of central importance in city-states, too – and they rule over territories which are administratively highly integrated without the need for internal coercion, unless they lose general support. The degree of centralization and integration of government which European nation-states began to achieve only in the course of the eighteenth century are thus inherent in city-state government and do not necessarily require the concentration of physical force in the hands of the government. The history of city-state-formation therefore needs to be written primarily in terms of institutionalization – of administrative bodies and procedures, but also of commitment to expenditures and entitlement to revenues – and without privileging war and coercion over other spheres of government, among which finance is particularly important. The institutionalization of funding, i.e. the creation of 'public' finance, is likely to be central to the process.

It is not as self-evident as it may seem that Athens fits the pattern of the city-state rather than the national state. Its territory, Attica, contained dozens of other settlements, some of which were quite sizeable: the largest, Acharnae, must have had at least 10,000 inhabitants in the late fifth century. Moreover, although it is usually assumed that this large territory was politically unified no later than the eighth century BC, some have suggested that this did not happen until the reforms of Cleisthenes in 508 BC. If so, the early history of the Athenian state might have combined features of the development of a city-state administration within Athens itself and the development of a 'national' State insofar as this government also imposed central control over local authorities.[19] It will be argued below that, at least from the time of Solon onwards, Attica did indeed have a centralized government dominated by a single large town, so that Athens does represent the type of development associated with the city-state, but it is nevertheless important to note that, unlike in most city-states, the

relation between central power and local community was potentially a bone of contention.

On the definitions of 'State' and 'public finance' adopted here, their development must be assessed above all by the degree of complexity of institutionalized power in general and power over material resources in particular. Complexity may be measured by a number of criteria. First, the degree to which institutional powers and responsibilities are precisely articulated and legally enforceable, i.e. the extent to which they are *formalized*. Secondly, the degree to which powers and responsibilities are divided among a variety of institutions with specialized functions, i.e. the extent to which they are *differentiated*. And thirdly, the degree to which the allocation and exercise of powers and responsibilities is structured into coherent system according to some overarching principle, such as efficiency, accountability or hierarchy, i.e. the extent to which it is *rationalized*.

Even if we must put the complexity of institutions first in assessing state-formation, the centralization of power – including coercive power – remains another important aspect of the development of government. In a city-state where the imposition of 'national' control over local administration is not a significant part of process, we may still find centralization in the sense of government acquiring more and greater powers. The *range* of powers may in principle embrace any aspect of life within four broad spheres: relations within the community, relations with other communities (including trade as well as diplomacy and war), relations between the community and its natural environment (centring on the exploitation or protection of the latter), and relations between the community and its supernatural environment through the worship of its god(s). What we may call the *intensity* of power varies according to how closely and frequently government intervenes in each of these spheres and how much power it can bring to bear when it does intervene. Centralization in this sense is independent of complexity. After all, modern politicians reduce or increase the range and intensity of central power depending on whether they favour a 'welfare state' or 'small government' and a 'Big Society', without reducing the complexity of governmental structures, which remains greater than it has ever been before. Arguably, therefore, centralization is not an integral part of the process of state-formation. The two processes will, however,

often go hand-in-hand, and a growing range and intensity of central power is highly likely to affect public finance, insofar as it is almost certain to increase the cost of government.

A separate variable again is the *distribution* of central deliberative and executive powers, which will determine whether a government is monarchical or republican, oligarchic, timocratic or democratic, but is not necessarily correlated with either institutionalization or centralization. Nor does the distribution of power necessarily have an impact on public finance, though one may expect each type of regime to have its own characteristic spending priorities and distinct views on raising revenue. However, the distribution of decision-making and executive powers in matters of finance – the question of who has how much power over public resources – is clearly a factor of great importance in its own right.

Studies of the rise of the Greek state have, from antiquity onwards, been dominated by this last criterion, the distribution of power – to the one, the few, or the many – and even then have said little about the distribution of financial powers in particular. Insofar as institutionalization and centralization have been the subject of discussion, the emphasis has tended to be on their limitations. Instead of emphasizing, for instance, how remarkable it is that from the early fifth century onwards Athens disposed of institutionalized and centralized coercive power in the form of 300 public slaves, armed with whips, who maintained order at public meetings and assisted magistrates in the exercise of their duties, scholars have tended to stress that these 'policemen' exercised fewer functions than modern police forces.[20] From the mid-1980s onwards, it has been widely asserted that Athens had no institutionalized militia army before 508 BC, and no institutionalized navy until the 480s: the city is said to have relied entirely on private initiative and self-funded volunteers. Without the cost of warfare, the development of public finance is thought to have started equally late.[21] An admittedly extreme version of this view holds that classical Athens managed 'to support itself mainly on voluntary dues and contributions for almost 200 years' (Herman 2006: 395). In what follows, we will test such claims by systematically reconstructing all aspects of public finance and assessing the institutionalization, centralization and distribution of financial powers.

PUBLIC FINANCE AND THE ATHENIAN ECONOMY

A final reason why scholars have welcomed the notion of an archaic Athens without much of a state apparatus, let alone financial institutions, is that the city's economy has long been regarded as barely developed at all. The 'primitivist' or 'substantivist' model of the ancient economy as dominated by agriculture and an ideal of self-sufficiency leaves no room for states to do more than skim off revenue from a tiny trickle of trade.[22] However, the trend in recent scholarship has been to see more complex economic systems emerging at certain times and places in antiquity, and a more extensive role of government in economic life now seems possible.[23] This has potentially major implications for Greek public finance and constitutes yet another reason for a new exploration of the subject.

It will be obvious that ancient Athens did not match the complexity of the modern economy or systems of public finance. But it is not obvious that Athens remained anywhere near the 'simple' end of the spectrum, as certain assumptions about the ancient economy have encouraged some to believe and some of our evidence may seem to suggest. One major source, the Aristotelian *Oeconomica*, is centred on a collection of fund-raising expedients which give the impression that city-states only raised money in acute emergencies to which they 'responded with a range of *ad hoc* measures' at best (Millett 2010: 478). But the fact that this text and others chose to record anecdotes about exceptional expedients does not mean that the cities in question lacked a regular and well-developed system of public finance which was perfectly adequate in normal circumstances, and only fell short in time of war or famine. Similarly, ancient criticisms of steep or harsh taxation as 'tyrannical' do not necessarily mean that taxation as such was rejected in principle or uncommon in practice.[24] We should assess public finance on the basis of what was institutionalized and routine, and not primarily measure it by extraordinary schemes that happened to catch the eye of ancient authors.

As for assumptions about the ancient economy, the 'primitivist' view that the vast majority of ancient Greeks were engaged in subsistence farming implies a very limited economic base for public finance. But this

view is not as widely accepted as it once was, and in any case classical Athens was always regarded as at least a partial exception to the rule.[25] A couple of remarks in the Aristotelian *Oeconomica* imply that by 300 BC, Athenian agriculture was heavily commercialized. On the subject of storing farming produce, the author says:

> For the safekeeping of property, it is expedient to use the Persian and Laconian systems. Attic household management is also useful, for after selling they buy, and in the smaller households there is no placing in store. (1344b32–4)
>
> πρὸς δὲ φυλακὴν τοῖς τε Περσικοῖς συμφέρει χρῆσθαι καὶ τοῖς Λακωνικοῖς. καὶ ἡ Ἀττικὴ δὲ οἰκονομία χρήσιμος: ἀποδιδόμενοι γὰρ ὠνοῦνται, καὶ ἡ τοῦ ταμιείου θέσις οὐκ ἔστιν ἐν ταῖς μικροτέραις οἰκονομίαις.
>
> On small holdings the Attic system of disposing of produce is useful. On large estates it should be handed to the overseers, dividing it into what is to be expended annually and monthly. (1345a18–20)
>
> ἐν μὲν οὖν ταῖς μικραῖς κτήσεσιν ὁ Ἀττικὸς τρόπος τῆς διαθέσεως τῶν ἐπικαρπιῶν χρήσιμος: ἐν δὲ ταῖς μεγάλαις, διαμερισθέντων καὶ τῶν πρὸς ἐνιαυτὸν καὶ τῶν κατὰ μῆνα δαπανωμένων […] ταῦτα παραδοτέον τοῖς ἐφεστῶσιν.

The contrast here is between feeding a household from its own stored farm produce and feeding a household from money earned by selling this produce. Remarkably, the latter is presented as the *norm* among small farmers, who sell *all* their produce and buy everything they need. Only large landowners keep a year's supplies in storage – but presumably even they sell the surplus. These comments imply that in late classical Athens agricultural production was predominantly aimed at the market rather than at home consumption. A further implication is that the Athenian state at the time could well have drawn large revenues from levies on import, export and local sales.

An indication that agricultural production for the market was already significant in archaic Athens comes from a law reliably attributed to Solon which banned the export of all farm produce except olive oil.[26] Evidently, export had previously reached quite high levels, or it would not have been worth banning. Moreover, there was presumably a local market into which the ban tried to channel the produce that would

otherwise have been exported. And the exception made for olive oil strongly suggests that the export of this local speciality was already such an integral part of the Athenian economy that one could not even try to ban it.[27] The law by itself is hardly conclusive evidence for the nature of the archaic Athenian economy, and other evidence – for the import of grain and export of pottery, for example – remains hotly contested.[28] For our purposes, however, we need not pursue the debate any further, and merely note that one cannot simply assume that Athens, before or after Solon, had a closed agricultural economy with all the limitations on public finance this would entail. On the contrary, the nature of public finance in Athens may in itself be considered evidence for the level of the development of the city's economy.

Finally, ancient governments have generally been credited with a largely 'parasitic' or 'predatory' economic role, merely taking their cut from private economic activity or forcibly seizing wealth by confiscation, plunder or exaction of tribute. In that light, it may seem a foregone conclusion that Athens would not have engaged in active economic intervention or shared any of the other fiscal features of a modern State. Yet there is no doubt that classical Athens did have a 'public sector' insofar as the State was by far the largest employer in the city, and probably in the whole of Greece. The public naval dockyards in Piraeus, with their hundreds of state-owned warships in constant need of maintenance, must have been the largest industrial enterprise in the country, as was true of the naval dockyards of early modern Europe. What is more, by the mid-fifth century some 20 per cent of citizens made their living wholly or largely from state pay, which must have had a huge impact on economic life.[29] While conceding that Athens was in many respects quite unlike any modern State, therefore, we should not *a priori* rule out the possibility that it may have reached high levels of development even in some of the most 'modern' elements of public finance.

The 'new fiscal history' mentioned above provides helpful models and concepts for the analysis of the economic, as opposed to organizational, basis of historical systems of public finance. In an economy based on subsistence agriculture, the resources of public finance will inevitably be limited, and derive predominantly either from publicly-owned

resources or from forcible seizure. In the Middle Ages, the costs of central government were met largely from the produce of royal landed estates and other resources controlled by the ruler, such as mines. This system, labelled 'domain State', is accordingly regarded by historians as one of the major types of 'fiscal constitution' in European history.[30] Royal estates were not unknown in Greece, but more commonly, as in Athens, we find publicly-owned land, mines and other resources, leased out rather than directly exploited. The administration and legal status of royal domains and public land may differ significantly but the principle of generating funds from resources permanently allocated to the use of the government is the same.

Such revenues may be supplemented by forcible seizure. Within the community, the confiscation of property and imposition of fines can produce a sizeable income, while raiding or conquering other communities will bring in plunder or tribute. In predatory or expansionist communities such external revenue may dwarf all other sources of income, and the label 'tribute State' may be appropriate for its financial system. These violent means of acquisition are not confined to agricultural subsistence economies, but their relative significance is liable to become smaller in more complex economic systems capable of generating large revenues by other means.[31]

In a predominantly agricultural society, taxes on property, income or persons are likely to be levied only occasionally, to meet extraordinary expenditure, above all on warfare. In more complex economic systems, however, such levies and additional indirect taxes on import, export, sale and consumption tend to become a major source of revenue. In the late Middle Ages, the developing nation-states of western Europe thus turned from 'domain' into 'tax States'. The commercially active city-states of Italy and Germany made this transition centuries earlier.[32] These city-states also relied heavily on borrowing to finance their activities, which became a common source of public revenue in the larger states, too, when their economies developed sufficiently to enable the use of credit on a large scale. From about 1700 onwards, the major western European states have operated with a permanent public debt and spent a large proportion of their revenue on servicing these debts.[33] Ironic as it may seem, extensive reliance on borrowing counts as a defining feature of

the most developed type of public finance, the 'fiscal State' as opposed to mere 'tax State'.[34]

The other major characteristic of the 'fiscal' State is the extent to which it does not merely extract wealth to meet public spending needs but actively uses financial means to direct the economy and the distribution of wealth. Progressive taxation aims to reduce economic inequality, while such things as tax (dis)incentives and the manipulation of interest rates or currency valuations serve to steer economic activity and promote overall economic growth – essential to maintaining the state's creditworthiness in the face of mounting public debt.

In the light of these models, we will be asking a series of questions about the material basis of Athenian public finance, as well as about its organization. What sources of revenue were available and how were they exploited? How, if at all, was public finance actively employed to stimulate economic activity and generate more revenue? Ideally, one would also want to know what proportion of gross domestic product or national wealth was extracted for public use, which would give us an objective economic measure to compare systems of public finance in Athens and other States. The limited evidence unfortunately makes it impossible to answer this last question, but we may still make tentative comparisons by assessing the value of Athenian public finance in relation to its economic base: a territory of *c.* 2,500 km^2 and a population of no fewer than 100,000 in the early sixth century and perhaps 400,000 at the city's peak in the fifth century.[35]

These are our reasons for investigating the early history of Athenian public finance, the questions to be asked, and the concepts to be applied. Our account will start outside Athens, with a sketch of long-term trends from the age of Homer to the end of the archaic period, which provides the background against which we must try to reconstruct and understand Athenian public finance (Ch. 2). We will then trace the nature and development of the institutions (Ch. 3), expenditures (Ch. 4), revenues (Ch. 5) and media (Ch. 6) of public finance in Athens, from the reforms of Solon in 594 BC, where our Athenian evidence begins, to the transfer of the war chest of the Delian League, the largest secular treasury in the Greek world, to the Acropolis in 454 BC, and the introduction at roughly the same time of state pay for jurymen, councillors and holders

of political office. Complex institutions of state finance, centred on military expenditure, are already in place at the start of this period; by the end, they had reached a level of development comparable in many respects to the systems of public finance found in the national States of early modern Europe, if on a smaller scale, and had laid the foundations for the democracy and empire of classical Athens.

2 Athens in Context: Public Finance in Archaic Greece

Evidence for Athenian public finance from the reforms of Solon in 594/3 to the transfer of the Delian League treasury in 454 BC is scarce and controversial. Its interpretation often depends on general considerations of what seems likely or unlikely for a Greek city-state in the archaic age. Before we turn to the Athenian material it is therefore important to establish a composite picture of what we know about communal and public finance in the rest of the archaic Greek world. This will help to define the parameters of the possible and probable in our interpretation of Athenian institutions, and to identify some key general developments of the period in which Athens is likely to have shared. Starting with Homer's epics, there is a good deal of evidence for the funding of communal and public activity, much of it centred on providing ships and crews for war and other collective enterprises.

BEFORE SOLON: HEROIC PRECEDENTS

Epic works of fiction cannot be expected to distract audiences from the great deeds of their heroes by spelling out who paid for these adventures, and how. So it is surprising that the *Iliad* and *Odyssey* do in fact reveal an outline of public revenues and spending as imagined by the poet, who for such incidental and mundane detail probably drew on his own age, *c.* 700 BC.[1] It emerges that the principle of communal – as opposed to both public and private – finance was well-established, based on revenue from a 'domain' and supplementary levies, and of an informal kind insofar as it typically involved 'gifts' and 'favours' rather than institutionalized rights and obligations.

The most informative example of public funding in the heroic world are the arrangements made for Odysseus' return home by the Phaeacians, who represent a highly idealized version of a contemporary Greek community. Alcinous, the king, decides to escort his guest back to Ithaca almost as soon as Odysseus arrives at his house, and wins instant approval from 'the lords' (*basileis*), 'the leaders', who are dining with him.[2] Yet this is not the end of the matter: Alcinous insists on convening 'elders in larger numbers' the next day (*Od.* 7.189) and repeats his proposal in the presence of this extended elite, in the agora.[3]

> Come, let us drag a black ship down to the shining sea, a vessel which has never sailed before, and let fifty-two young men, those who are currently the best, be selected from the community (*demos*) […] Then you must come to our house and prepare a quick meal; I shall provide ample for everyone. These are my orders to the young men […](8.34–9)

These instructions are followed without debate (8.46–55). It is remarkable that the poet does not simply have the king use a ship of his own, but feels the need to have him ask the members of what is in effect a large council to make a ship and crew available. At first sight, this may seem to suggest that a public decision is being made about public ships, but that is unlikely since the Phaeacian harbour is divided up into private moorings: 'each and every man has his own berth'.[4] Evidently, the king is asking not only for the collective approval of the leading men but also for a volunteer among them to offer the use of his own (newly-built) ship for the voyage. The crew does not simply consist of the king's or ship-owner's personal friends and followers but is somehow selected from across the community. The rowers are rewarded for their services in advance, with a feast given by the king, who also supplies 'grain and wine' for their journey.[5]

This is not the end of the Phaeacians' generosity towards Odysseus. The thirteen most prominent 'lords' each give him a cloak, tunic and talent of gold from their own resources (*Od.* 8.389–99, 417–41; 13.10–12), and later add 'a large tripod and cauldron per man'. Although even these gifts would barely make a dent in the Phaeacians' fairy-tale wealth, Alcinous reassures them that their cost will be devolved (13.13–15): 'We will compensate ourselves later by collecting among the people [ἀγειρόμενοι κατὰ δῆμον], for it is hard for one man to do favours for free.' So the heroes' famous generosity is funded

by the informal equivalent of taxation, an *ad hoc* levy, and the poet explicitly justifies this by stating as a general principle that one cannot expect a few members of the elite alone to carry these costs. The hospitality and transport provided for Odysseus is thus arranged with the aid of a mixture of communal and private resources, and subject to the community's approval in the form of the consent of the assembled elite.

We see the same pattern in the mobilization of ships for war. A prolific Cretan sea-raider claims that the Cretans 'ordered me […] to lead ships to Ilion; there was no way to refuse, for the voice of the people was harsh' (*Od.* 14.235–9). We are surely to understand that the raider came under such pressure mainly because he was able to provide his own warships – he has nine vessels (14.248–51). Again, a collective decision is made on the communal use of privately-owned ships.[6]

Like Alcinous, the Cretan and other captains provide not only ships but also food and drink for their crews.[7] Hence the presence in the Greek camp at Troy of non-combatant male 'housekeepers (*tamiai*), distributors of food', probably one for each ship's crew (*Il.* 19.42–5). On public expeditions, these supplies could be provided at communal expense. When Odysseus' fleet of twelve ships finds itself stranded on Crete for twelve days, the local ruler offers private hospitality to Odysseus himself but passes on the bulk of the cost: 'to the rest of the companions who followed him', he says, 'I gave barley flour and sparkling wine and cattle to sacrifice, collecting from the people' (δημόθεν […] ἀγείρας; *Od.* 19.196–8). The cost of feeding Odysseus' men would not have been beyond the means of a king of Knossos,[8] so it is striking that Homer feels the need to articulate again the principle that private funding by the elite can only be expected to go so far and that larger bills must be footed by the community.

Another illustration of this principle is Hector's reminder to the tens of thousands of 'allies' (*epikouroi*) who have come to defend Troy that 'I exhaust the people (*laos*) with [demands for] gifts and food, but I lift the spirit of each of you' (*Il.* 17.225–6). He laments that Troy's legendary wealth has shrunk to nothing: 'many of our possessions have been sold and have gone to Phrygia and Maeonia' (18.291–2; cf. 9.401–3), presumably not so much in direct exchange for the military services

of the Phrygians and Maeonians, who play a very minor role in the war, as because they have been bartered in these neighbouring regions for supplies in order to feed the allies. These comments confirm not only that leading men can resort to raising public funds to pay for warfare, but also that military support is not offered purely as a favour: foreign allies, like ship's crews, expect to be provided with food and drink.

They also expect to be rewarded with 'gifts' in addition to basic sustenance, as Hector notes. The reward for ships' crews on peaceful voyages is a lavish feast before or after the expedition, which may be described as their 'travel-payment' (ὁδοιπόριον; *Od*. 15.506–7). The main reward for participants in a military venture is a share of the spoils. Apart from arms and armour captured in combat, all spoils are gathered in a central place and divided up by a king or commander, without keeping anything in reserve or in a communal store (*Il*. 1.124–6). The shares are not equal but 'fair' (*isos*), i.e. in proportion to individual merit and status, and special 'prizes' (*gera*) are awarded to leaders and other outstanding men (*Il*. 9.334). It is the ruler or leader who assigns prizes and shares of booty to himself and others, but his awards are made on behalf of the whole community or army, whose wishes he notionally represents.[9] In practice, the group has little or no influence over the distribution, as is evident from repeated complaints that leaders keep far too much booty for themselves (*Il*. 1.163–8; 2.225–33; *Od*. 10.40–2), but it is significant that in conception, at any rate, it is the community as a whole which offers these rewards for military service.

Irregular expenditure on war and diplomatic travel in Homer is thus funded by the community, through its leading men, by means of contributions to *ad hoc* levies and sharing out of occasional collective income such as booty. More regular expenditures appear to be covered differently. Most prominent is the cost of public meals for the leading men in a community or army. The 'leaders and councillors of the Greeks' at Troy are men 'who beside Agamemnon and Menelaus drink at public expense' (δήμια; *Il.* 17.248–51). It is at such public feasts that Agamemnon offers special shares of meat and wine to highly respected commanders 'whenever we Greeks prepare a meal for the elders' (δαῖτα γέρουσιν ἐφοπλίζωμεν Ἀχαιοί, 4.343–6) and 'whenever the best of the Greeks mix in a bowl the wine of the elders' (γερούσιον οἶνον, 4.259–63).

Alcinous, too, speaks of Phaeacian lords 'who always drink the wine of the elders in my house' (*Od*. 13.8–9). The kings may host these gatherings of elders, but their hospitality is once again somehow offered on behalf of the community ('us Greeks').[10] We may assume that the same applies to sacrifices at public festivals (*Od*. 3.5–8; 20.276–8).

One form of revenue which funded such public hospitality is hinted at by Nestor, who urges Agamemnon to host a 'meal for the elders' at which he can solicit their advice: 'this is appropriate, not improper: your quarters are full of wine which Greek ships bring every day from Thrace over the wide seas. You have every means of providing hospitality; you rule over many' (*Il*. 9.70–3). Part of this rather obscure passage is illuminated by an earlier episode (7.467–5):

> Many ships had arrived from Lemnos, sent by Euneus son of Jason, bringing wine […] For the sons of Atreus, Agamemnon and Menelaus, the son of Jason separately gave them 1,000 measures of sweet wine to carry. From these ships the long-haired Greeks drew wine, some in exchange for bronze and some for gleaming iron, some for hides, some for live cattle, and some for slaves.

These ships from Lemnos come to sell wine to Greek soldiers, but their owner donates a large quantity of wine to the supreme commanders, presumably to win their favour and to be allowed to do business in their camp. This is an informal precursor of harbour or market tolls (cf. *Il*. 23.741–5). The Greeks who bring wine from Thrace must also be traders who present part of their cargo to the king.[11]

Gifts from traders are only one among many kinds of gifts which a king receives from his subjects: hence Nestor adds that 'you have every means of providing hospitality; you rule over many' (9.73), while Agamemnon himself says that a ruler's subjects will 'honour him with gifts like a god' (*Il*. 9.155–6, 297–8), and Telemachus elsewhere notes that whoever becomes king will 'soon get richer' (*Od*. 1.392–3). Sheep and goats are common offerings (*Il*. 24.262; see below).

Two further forms of revenue are fines and confiscations. Refusal to serve in the Trojan War could be punished by 'the harsh fine of the Greeks' (θωὴν Ἀχαιῶν, *Il*. 13.669), while Hector threatens the Trojans that any deserter 'must collect his possessions and give them to the people to be consumed by the community' (συλλέξας λαοῖσι δότω καταδημοβορῆσαι,

Il. 18.300–2). Similarly, it is said of a man who has been involved in an ill-advised raid that 'the people' (δῆμον) of Ithaca 'wanted to kill him and rip out his heart and devour [κατὰ […] φαγέειν] his ample livelihood' (*Od.* 16.424–30). To 'devour' is used in an inscription of 500–470 BC as a technical term for confiscation (ML 20.41–2), and this is clearly what Homer too has in mind. Fines and confiscations are conceived of as imposed by the whole community, and the assembled people may play an active role in exacting punishment: the poet alludes to public stoning (*Il.* 3.56–7) and to the possibility that the people of Ithaca may drive many of their local leaders into exile (*Od.* 16.376–82).[12]

Finally, the people bestow upon their ruler a landed estate (*temenos*), which he passes on to his heirs. The bread and wine for the feasts of the elders, for public sacrifices, for foreign visitors and for ships' crews on public missions are surely all provided by this estate, which is thus in essence much like the 'domain' which in medieval Europe funded the ruler's routine expenses (above, p.14). In conception, however, the Homeric royal estate differs fundamentally from its medieval counterpart: the *temenos* is seen as yet another gift from the people, for which the ruler remains obligated to the community.[13] Whatever costs the king's domain meets are accordingly regarded as paid 'at public expense'.

The range of public revenues and expenditures in Homer is very similar to what we find in archaic Athens and elsewhere in Greece, and such forms of public finance were clearly familiar by 650 BC at the latest, well before they are attested in archaic laws and institutions. But Homeric public finance is also of interest for the ways in which it differs from later archaic Greek systems. Most obviously, a sole ruler rather than a body of magistrates raises, allocates and spends revenue in the name of the community, though even in archaic Greece this would often happen where *tyrannoi* restored monarchy. Most significantly, revenues usually take the form of 'gifts' in Homer so that they are at least notionally voluntary, or at most a moral obligation, and their value cannot be prescribed, unlike later compulsory taxes and tolls. By the same token, expenditures may also be irregular and voluntary: rulers offer hospitality to as many elders as they see fit and as often as they like, rather than to a fixed body of men on set occasions; at times a ruler like Agamemnon needs to be encouraged to provide the 'wine of the elders'. But even

Homeric rulers do not rely entirely on the favour of their subjects: 'a lord who devours his people' (δημοβόρος βασιλεὺς, *Il.* 1.231) is a well-known figure, whether he is a ruler who appropriates to himself the bulk of the booty as a 'gift', or a 'rustler of rams and goats among his own people', i.e. a powerful man who demands gifts despite doing nothing to deserve these.[14] Informal reciprocity is the norm but coercion distinctly possible in Homeric communal finance.

BEYOND ATHENS: LATE ARCHAIC INSCRIPTIONS AND ORAL TRADITIONS

By the end of the archaic period, we are in a different world, where compulsory levies, fixed expenditures and a formal system of public finance are well established. We catch only glimpses of this world, mainly in inscribed laws, regulations, contracts and honorific decrees which are not primarily concerned with finance as such, but that is enough to outline some major aspects of public finance from the late sixth century onwards. The increasing quantity of evidence which becomes available at this time reflects a growing habit of recording decisions on stone and metal, but there are signs that it may also reflect real late archaic developments in public finance.

A crucial development was the emergence of wages for service to the community. The defining characteristic of a 'wage', *misthos*, as the term was used from Homer onwards, is that it was a reward agreed in advance for the performance of a specific service. Whether the wage was paid in kind, bullion or coin, the transaction was contractual and differed fundamentally from a 'reciprocal' transaction in which a service was performed voluntarily or as a favour for a beneficiary who might or might not reciprocate with a gift or counter-favour at his own discretion. In Homer and Hesiod, contractual service for a 'wage' was the norm for hired labour but exceptional in the public domain, where reciprocal relations prevailed, as we have seen.[15] By the late archaic age, contractual public service became increasingly prominent.

At Idalion in Cyprus, landed estates were awarded to the physician Onasilos and his brothers in recognition of their medical services

to the community during the Persian Wars. This voluntary service retrospectively rewarded with a gift by 'the king and the city' was very much in the Homeric manner, except that the decree noted that Onasilos had healed the wounded 'without a wage' (ἀνευ μισθῶν, line 4) and thus assumed that such services were normally performed on a contractual basis. A hired public physician is attested in Herodotus' story about the meteoric career of Democedes of Croton, who emigrated to Aegina in the 520s to practise as a healer and was so successful that 'in the second year the Aeginetans hired him at public expense (δημοσίῃ μισθοῦνται) for one talent; in the third year the Athenians for 100 minae, and in the fourth year Polycrates for two talents'.[16]

Several late sixth-century inscriptions from Crete confirm that by this time it was a well-established practice to reward public service with a wage, rather than with gifts, gratitude or prestige. An intriguing fragment from Eleutherna reads 'three obols for the fur-cloak-maker […] half a *hekteus* of barley; but if […] without wage (ἀμισθεὶ)', leaving us to guess what public service this craftsman may have performed. A document from Axos appears to set out general rules for public awards to specialists from abroad, and repeatedly mentions 'a wage' while also requiring 'five days working for the city, without wages' (πέντ' αμέρας ϝεργακσα[μένο]ς τᾶι πόλι ἀμίστος).[17] Best known is the contract between the city of Arkades and a scribe (*poinikastas*), Spensithios, whose duty was to 'record and remember for the city public matters (τὰ δαμόσια), divine and human' (lines 4–7). The contract grants Spensithios and his descendants a monopoly in perpetuity on public scribal activity, and sets out in detail the rights and privileges that come with the position, including tax-exemption, legal protection, maintenance in a public mess, and pay: 'the scribe must be given as an annual wage 50 jars of sweet wine and […] worth 20 drachmas or […]' (lines 11–13).[18]

The appointment of a public scribe is in itself a reflection of the growing importance of contractual relationships, which, more than reciprocal relationships, require the keeping of records in writing or in the memories of third parties, officials or witnesses. Most public records were kept on whitened wooden boards and accordingly do not survive, but an occasional exception, like the account cut in the rock at Delphi around 500 BC, shows that public financial record keeping was by no

means unusual in archaic Greece.[19] Most revealing is an account from the temple of Artemis at Ephesus. Originally published as a 'silver plaque' and accordingly interpreted as a highly exceptional document, probably part of a ritual deposit made at the foundation of a new temple, *c.* 550 BC, recent study by Jack Kroll has shown that it is in fact a strip of lead, a cheap and disposable writing material elsewhere attested as used for private letters and contracts. Side B had been used before, but the original text was erased and replaced with our account; eventually, the record was scrunched up and thrown away, rather than formally deposited. Its context and letter forms suggest a date around 600 BC.[20] This transforms our understanding of the document and of archaic Greek public record keeping at large: however one interprets the transactions mentioned here, their inscription on disposable materials which were casually erased or discarded shows that by 600 BC such financial records were routine.

From the literary evidence for contractual public service we may add the negotiations between Sparta and the seer Teisamenus of Elis, who demanded as his 'wage' citizenship and 'a share of everything' for himself and his brother in 479 BC, much the same terms as those granted to Spensithios in Crete.[21] Although physicians, seers, scribes and perhaps others in permanent public service were few in number, competition among political and military rivals to hire the best specialists made them quite costly, whether they were paid with land and citizenship for lifetime service or with fixed sums of money on annual contracts.

Most significant was the development of a wage for military service. The principle was not entirely unknown to Homer: Hector promised the 'great gift' of a two-horse chariot from future booty as the reward for a reconnaissance mission, adding that this would be 'a secure wage' (μισθὸς ἄρκιος; *Il.* 10.303–4, 319–32). We also hear that Othryoneus offered his military services in exchange for the hand of Cassandra in marriage, to which her father formally agreed: the word 'wage' is not used here, but the relationship is clearly contractual (*Il.* 13.363–9). Archilochus' remark 'I shall be called an *epikouros*, like a Carian' (fr. 216 West) implies familiarity with military service on a contractual basis – otherwise being an *epikouros* could not be a career choice, as it evidently was for many Carians – by the mid-seventh century, but at this time the hiring was done by non-Greek states, especially Egypt.[22] It may be no coincidence

that in Homer, too, it was Trojans, not Greeks, who occasionally offered a 'wage'. Otherwise, as we saw, soldiers and rowers in Homer were bound instead by reciprocal and moral obligations and rewarded only with food, drink and whatever 'gifts' and shares of booty their leaders felt they deserved. By the late archaic period, by contrast, contractual service in war begins to be more widely attested in war.

The literary sources mention 'hired' (μισθωτοὶ) and 'wage-earning' (μισθοφόροι) soldiers,[23] especially in archaic Athens as we shall see, but also under Polycrates of Samos, who is said to have had 'a large number of hired *epikouroi*' at his disposal by 525 BC, and under the tyrants of Syracuse and Acragas, who 'hired' troops on a large scale from *c.* 485 onwards. Not coincidentally Polycrates and the Syracusan tyrants were bracketed together by Herodotus as the 'most magnificent' rulers known to the Greek world.[24] It is likely that such troops usually received monetary wages, but soldiers might instead contract for life-long service in exchange for land and citizen rights. This is attested in a late sixth-century law from Locris or Aetolia (n.39, below), which allowed the distribution of public land only in the event of a collective decision in time of war to recruit 'at least 200 men capable of fighting' (lines 7–9). In modern eyes, there may be a great difference between short-term 'mercenary' service for money and permanent military service in exchange for full membership of the community, but the two arrangements are essentially two ends of the spectrum of contractual relations – the same spectrum that lies between Democedes' series of annual contracts and Teisamenus' or Spensithios' appointments for life.

In addition to his 'hired allies', Polycrates also commanded 1,000 'native archers' (Hdt. 3.39.3, 45.3), which may suggest a standing force of specialist citizen troops. Several rulers are said to have maintained 'guards', starting with Periander of Corinth around 600 BC who allegedly kept a force of 300 men, but whether these were paid is not clear. If the guards were foreign soldiers, they would surely have required wages, but Aristotle suggests that guards were often allocated by public decree in the archaic period (*Rhet*. 1357b30–6) and would thus presumably have consisted of citizens, perhaps well-off political supporters. The guard of Hippocrates of Gela, *c.* 500 BC, at any rate, included citizens of very high standing who no doubt served as volunteers rather than for pay.[25]

Crucial evidence for the payment of wages to military personnel appears in an inscription from Eretria, *c.* 525–500:[26]

Those who sail are to receive pay	τὸς πλέοντας ἀρ[έσ]θαι μισθὸν
if they go beyond the Petalai	*h*οίτινες ἄν π[ε]ταλὰς : ἔ κεναιον
or Kenaion.	[ἀ]μείπσονται φέ[ρ]εν δὲ πάντας
Everyone must contribute.	

Most scholars, wedded to the notion that there were hardly any public warships in Greece before the Persian Wars, have missed or rejected the obvious interpretation of this law. 'Those who sail' must include everyone travelling overseas – beyond the extreme northern and southern points of Euboea – on public business, the single largest group of whom were the rowers, sailors and soldiers who travelled on Eretrian warships. The clause 'Everyone must contribute' instituted a tax to pay for this expense. If 'Those who sail' had meant only public envoys, the law would have said so specifically, as we know other archaic laws did,[27] and it would have been unnecessary to create a tax to cover this small expense. If 'Those who sail' had meant ferrymen, as some scholars have suggested, the law would at a minimum have had to stipulate rates and routes; as it stands, it would have been a redundant, and oddly vague, enunciation of the principle that passengers must pay the ferryman.[28] The Eretrian law only makes sense if it refers to soldiers and oarsmen on military expeditions. It did not set a level of pay but established the twin principles that wages should be paid for overseas military service, and that these wages were to be funded by taxation.

The introduction of military wages was of historic significance. First, it meant that soldiers, oarsmen and sailors no longer relied for a reward on the generosity of the community and its leaders, but engaged in a contractual relation which made them less members of a communal enterprise than employees of the city. This was a major step towards conceptualizing the city as a 'State', not just a community. Secondly, soldiers and ships' crews were no longer rewarded with a 'fair' share of plunder according to personal merit and status, in the Homeric manner, but with a fixed and equal wage, which meant that whatever their standing as members of the community, they were equals in

relation to the State. Thirdly, their rewards were no longer funded from the spoils, but by taxation, which meant a vast expansion of public finance: the authorities now needed to levy enough not only to supply their forces with the bare necessities, but also to reward them with a wage, while at the same time any profits of war were no longer treated as communal property to be shared out among the troops, but as public property to be kept in reserve.[29] The institutional change of increasing the city's expenditures and tax burdens, and even more crucially the changes in perception of the relation between the city and its military personnel, marked fundamental advances in state-formation (as defined above, pp.5–10).

A trend towards formalization of expenditure is also visible in public hospitality. Invitations were no longer at the discretion of a ruler, but a formal 'right to dine in the *prytaneion*' was accorded to certain public officials and awarded as an occasional or permanent honour to private individuals, including victors in the Olympic Games (Xenophanes fr. 2.8–9 West). In Cretan cities, the equivalent honour was 'maintenance in the *andreion*' (τροπὰν ἰν ἀντρηίοι), a public mess for adult male citizens. Public hospitality for foreigners, too, was subject to formal regulation.[30]

The crucial change in public revenues was the rise of formal taxation. Apart from the levy instituted by the Eretrian law on naval pay, taxes are attested by awards of *ateleia*, tax-exemption, to persons of special merit. Sometimes exemption 'from everything' (παντῶν) is awarded, which suggests the existence of a range of levies and dues. This is confirmed by a sixth-century inscription from Cyzicus, which lists no fewer than five exceptions to an exemption from all taxes:

> Under Maiandrios, the city gave to the son of Medikes and the sons of Aisepos and their descendants tax-exemption and the right to dine in the *prytaneion* – with the exception of *naussos*, the *talanton*, *hipponia*, the 'quarter' (*tetarte*) and *andrapodonia*. They are exempt from everything else, and the people took a sacrificial oath on this. The city gave this stela to Manes, son of Medikes.[31]

The *hipponia* and *andrapodonia* must be taxes paid on the sale of horses and slaves, respectively; the *talanton* may be a fee for the use of the balance in a public weighing house; and the *naussos* is probably related to ships. Trade was thus subject to quite a few levies, and these were

apparently only a fraction of the taxes and dues normally imposed by Cyzicus. Elsewhere, an obligation to contribute sacrificial animals for a number of public occasions is mentioned as an exception to an 'exemption from everything' awarded at Axos in Crete, 525–500; a tax on farmland or produce is implied by a grant of estates 'exempt from tax' at Idalion in Cyprus in the 470s; and a levy on overseas exports is attested at Knossos, *c.* 460 BC.[32]

Taxes were apparently raised at both local and regional level in Locris and Thessaly by 450 at the latest. Locrian settlers at Naupactus were subject to local taxes levied by the city and regional taxes collected by 'the western Locrians', but exempt from regional taxes levied by 'the Hypocnemidian [i.e. eastern] Locrians'. In Thessaly, Sotairos of Corinth and his dependants were granted exemption from both regular taxes and from additional taxes levied when there was a supreme magistrate (*tagos*) over all Thessaly.[33] A regulation from Sicyon, *c.* 500, for the common use of a dining hall (*hestiatorion*) by 63 named persons, 'while they are resident and contribute their dues' (τὰ τέλε φέρουσιν), illustrates the extent to which levies were formalized at all levels, including private associations.[34]

The levying of taxes and dues was thus pervasive by the late archaic period, and the limited literary evidence for archaic taxation confirms this. Most significant is Herodotus' observation on the wealth of Thasos in the 490s: 'In total, from the mainland and the mines 200 talents each year, or 300 when revenues were at their peak, accrued to the Thasians, who were exempt from tax on their crops (ἐουσι καρπῶν ἀτελέσι, 6.46.3).' A tax 'on crops' was presumably a tithe on agricultural produce, and Herodotus by implication regarded this as a common practice, which only a city with extraordinary alternative sources of revenue could, and would, abolish. Similarly, Aristotle claimed that Periander, *c.* 600 BC, governed Corinth 'exacting no other tax and being satisfied with those from the *agora* and the harbours'.[35] Periander's construction of a slipway across the Isthmus does suggest that he sought to increase his revenues from transit trade, and it seems possible that such tolls brought in enough to allow the abolition of taxes on the produce of land.[36]

Additional revenue continued to come from fines and confiscations. Fines are sometimes explicitly paid into a 'public treasury' (*demosion*),

and from at least 550 BC onwards their value is often prescribed in weights of precious metal – either bullion or one of the coinages introduced in the archaic period (see below, Ch. 6) – though we also encounter fines in kind, such as 'a cow' as the penalty for having sex in a sanctuary, or '30 *medimnoi*' of grain.[37] Confiscation is commonly referred to as 'making property public'. Many of the seizures of property attributed to 'tyrants' in the literary evidence may well have been public confiscations as the outcome of a formal legal process. By the late archaic period, cities sold off confiscated property to private buyers.[38] Royal estates continued to exist in a few parts of the Greek world such as Sparta and Cyrene, but were elsewhere replaced by public land, the existence of which is implied by public grants of estates, and indeed explicitly attested in a late sixth-century law from Locris or Aetolia; such land was presumably rented out.[39]

Although it is impossible to quantify the contribution of each form of revenue to public funds, the evidence for a wide variety of taxes suggests that by the late archaic age, Greek cities had not only moved from informal customs to formal institutions of public finance but also turned from 'domain States' into 'tax States'.

OUTSIDE GREECE: THE IMPACT OF PERSIAN EXPANSION

Archaic Greece was open to a variety of influences from the wider world, and drew heavily upon Near Eastern models for some of the basic technologies which became integral to public finance – record keeping, weighing and measuring, minting coins.[40] A significant proportion of the wealth in circulation and in store derived from gifts and payments of gold, silver and other valuables by the kings of Lydia, Egypt and Persia to Greek sanctuaries, cities, political factions and individuals.[41] The most important external influence on the development of Greek public finance, however, was the naval expansion of the Persian empire from 530 BC onwards, which forced Greek cities to adopt a new, much more costly type of warship, the trireme, which in turn required drastic restructuring and extension of naval organization and public funding.

The historic significance of the introduction of the trireme was identified already by Thucydides, in whose interpretation of early Greek history naval developments it played a central role. He did not need to spell out the financial implications, which will have been obvious to his audience. The ship which predominated for most of the archaic age was the penteconter, normally a fifty-oared ship as the name implies, although it seems that a two-level version with a hundred oars also existed from Homer's time onwards.[42] With their large armed crews and relatively small storage capacity, these vessels were clearly designed for use in raiding, piracy and war, and only secondarily used for the purpose of trade – much like Viking longships.[43] (Specialized sail-powered merchant ships appear not to have been used by Greeks until the mid-sixth century.[44]) The trireme was designed even more purely for military activity, and crucially had a much larger crew – 200 men, including 170 rowers – so that it required two to four times as much manpower. This meant that only a very small number of the wealthiest and most ambitious men could afford to keep a private trireme, whereas ownership of a penteconter, while still of course costly, was within reach of a larger number. It was therefore possible in principle to assemble a sizeable fleet from privately-owned penteconters, but no city would have been able to rely on the availability of more than a few privately-owned triremes. A trireme navy could only be sustained by building and manning ships at public expense.[45]

That the older fleets of penteconters did indeed consist largely of privately-owned ships mobilized for public service is widely accepted.[46] The penteconters in which the Phocaeans made their private voyages to Italy and Spain in the early sixth century and in which they migrated to Corsica *c.* 545 were surely the same vessels in which they used to raid their new neighbours and finally defeated the fleets of the Carthaginians and Etruscans, *c.* 540.[47] Even better evidence may be hidden in a famous anecdote about Polycrates of Samos. During his rise to power in the 530s, Polycrates 'acquired 100 penteconters […] He plundered and pillaged everyone, making no distinctions, for he said that one does a friend a greater favour by giving him back what one had seized than by not seizing anything in the first place' (3.39.3–4; cf. Diod. 11.16). Herodotus

no doubt told the story to illustrate the arbitrary nature of tyrannical power. But even for a tyrant this is bizarre behaviour, unless we assume that Polycrates allowed indiscriminate *private* raiding by his subjects, at the cost of having to offer public compensation to any victims with whom Samos had recognized ties of friendship. A particular victim may have been Egypt, which was always a popular target for raiders but also Polycrates' main ally in the early years of his reign.[48] Such freedom to raid would have encouraged Samians to acquire private warships and thereby add to the number of vessels available for service on public campaigns.

The tradition that Polycrates developed a type of ship called the *samaina* – a shorter and wider version of the penteconter, with two tiers of oarsmen, and a distinctive prow in the shape of a boar's head – throws further light on this process. Polycrates did not just need private individuals to build raiding ships, but he needed them to build ships of this new, superior type, rather than rely on their old vessels. An extra incentive would have been needed, and freedom to raid served that purpose.[49]

We shall see that there is indirect evidence for privately-owned warships in Athens as well (p.64). For much of the archaic period, then, the mobilization of ships for war did continue to follow the Homeric model, and the development of public trireme-navies must have entailed great changes in organizational and financial infrastructures. When, how and why did this come about?

As part of his argument that there had been no significant wars in the past, Thucydides dated the supersession of the penteconter by the trireme very late. He claimed that early Greek navies consisted mainly of 'penteconters and long ships', until Corcyra and 'the tyrants in Sicily' acquired a large number of triremes 'shortly before the Persian Wars and the death of Darius' in 486 BC. In mainland Greece navies continued to be small and to consist mainly of penteconters until Themistocles proposed his programme of trireme-building, in anticipation of a Persian invasion (Thuc. 1.14). In outline, Herodotus suggested much the same picture, emphasizing the use of penteconters by even the greatest naval powers – not only Greeks, but implicitly also Carthaginians and Etruscans[50] – and the transformation wrought by Themistocles. But in the course of his detailed account of late

archaic history, Herodotus also provided information which suggests a different picture of development.

In 525 BC, when the Persian king Cambyses invaded Egypt with a large army and navy, he used a trireme from Mytilene on Lesbos to carry the envoy who was to negotiate the surrender of the Egyptians; Polycrates sent 40 triremes to join the expedition, but his ships deserted.[51] About ten years later, Greeks from Ionia, Aeolia and both sides of the Hellespont 'led', i.e. formed the largest part of, a Persian fleet of an alleged 600 triremes sent out to bridge the Danube.[52] Around 510, a Persian commander captured Lemnos and Imbros, 'taking ships from the Lesbians', while in 500, a Persian fleet of 200 triremes again included ships from Mytilene, Miletus, Cyme and other Greek towns.[53] At the battle of Lade in 494, more than 350 triremes fought on the Greek side, including 100 from Chios, 80 from Miletus, 70 from Lesbos and 60 from Samos.[54] In contrast to Thucydides' picture of naval warfare dominated by penteconters, then, we find that in the eastern Greek world large numbers of triremes were already in use from 525 onwards. Moreover, in 480, the fleets of mainland and western Greek cities, too, consisted entirely of triremes, and the penteconter had gone almost completely out of use as a warship.[55] Unless we are prepared to posit that all Greek cities abandoned the penteconter simultaneously and comprehensively between 483 and 480, therefore, triremes must have become the norm across Greece earlier than Thucydides liked to admit.

The suddenness and timing of the Greek conversion to trireme fleets is a clue to its cause: in the 530s, even the most ambitious Greek sea-power – Herodotus hailed Polycrates as 'the first in human history' to aim at 'ruling the sea' (3.122.2) – had nothing but penteconters; from 525 onwards, we hear of nothing but triremes. It was precisely in the years 530–525 that the Persian empire began to build up a navy for its confrontation with Egypt, which had used its own fleet to conquer Cyprus and try to establish control over Phoenicia.[56] The obvious conclusion is that the Persians financed the building and manning of triremes in Greek coastal cities under their control and islands within their sphere of influence. The Persians evidently subsidized above all those who voluntarily submitted, rather than were conquered, much as they would later fund the navies of Athens and Sparta. In 494, Samos, Chios, Lesbos and Miletus, which had surrendered

but retained much independence, had vastly larger numbers of triremes (pp.60–100) than the Ionian cities taken by force (pp.3–17). Polycrates surely also received his 40 triremes as an 'ally' of Persia.[57] In order to build and maintain these new navies, new institutions had to be put in place, but there may not have been much need for fundamental changes in public finance, given the supply of Persian money. In the rest of the Greek world, however, these developments must have had an even greater impact, because they created a need for triremes where no such material support was available: new financial structures needed to be created.

The relations of rivalry and friendship which criss-crossed the Greek world meant that the adoption of the trireme could not easily remain a localized phenomenon. To take only the most pertinent example, Athens was at the time in direct rivalry with Samos for hegemony in the Cyclades, as we shall see (p.58), and simultaneously a close ally of Samos' rival Miletus (Hdt. 5.97; 6.21.2). When its rival and its ally each acquired a large trireme fleet in the 520s, Athens must have felt considerable pressure to upgrade its own fleet of penteconters. Even more acute was the threat posed by the fleet of 40 triremes which defected from Polycrates and went on to terrorize the Aegean for five years, after failing to seize power in Samos itself. They attacked the island of Siphnos, from which they extorted 100 talents, and then Hermione on the mainland, from which they took the off-shore island of Hydrea, before finally occupying Cydonia in western Crete, where they 'prospered' and built temples, until they lost a naval battle against the Aeginetans and were sold into slavery, *c.* 520.[58] Herodotus attributes Aeginetan hostility to an old grudge, but it seems almost certain that much of the Samians' prosperity came from raiding and attacking merchant ships on the route past Crete to Northern Africa and Egypt. This would have created immediate pressure on mainland Greek cities to match the Samians' naval power. Indeed it is hard to see how the Aeginetans could have defeated them at sea unless they themselves had also built up a navy of 40 triremes or so between 525 and 520 BC.[59] Once Aegina had triremes in numbers, the pressure on its neighbours, including Athens, to acquire these as well increased exponentially.

A wave of displaced Ionians migrating in triremes to Sicily after the failure of the Ionian revolt may help explain why trireme fleets were,

according to Thucydides, built in Sicily around 490.[60] At the same time, expansionist Sicilian rulers first attacked Phoenician settlers in the west of the island, who had recently come under the imperial control of Carthage. If Carthage had by this time acquired triremes – for which there is no evidence – this threat would of course have been a still greater incentive for Greek trireme building.[61]

The story of the spread of the trireme is complicated by notorious uncertainty about who, if anyone, had triremes before the naval expansion of the Persian empire. Herodotus thought that the Egyptians had used triremes from at least 600 BC onwards (2.159.1; cf. 3.4), which would explain why the Persians needed such ships for their assault on Egypt. If triremes did exist earlier in the Greek world, however, it can only have been in very small numbers, and for our purposes the origins of the trireme matter less than its rapid adoption as the dominant battleship from 525 BC onwards.[62]

An anecdote about the first arrival of the 40 Samian triremes at Sparta brings out the implications for public finance. Herodotus tells how the Samians made a long speech 'since they were in urgent need' (οἷα κάρτα δεόμενοι), after which the Spartans said that they could not remember the start and did not understand the end. The Samians tried again: they brought in a sack and said simply 'the bag needs barley'. The Spartans now replied that 'the bag' was redundant but that they would help (3.46). Herodotus suggests that the appeal was for military aid and that the point of the story was to illustrate Laconic brevity in speech, but what the Samians needed most urgently was financial support – 'they needed money', as Herodotus says later (3.57.1) – and 'the bag needs barley' was surely a literal request for grain to feed the crews. The original point of the story must have been that the Samians were forced not only to make a shorter speech but to scale down their demands to the bare minimum. Food is indeed what Sparta provided in the sequel, which Herodotus omits. With typical Spartan austerity, they imposed a day of fasting on themselves, their helots and their animals in order to save the food which the Samians needed ([Arist.] *Oec.* 1347b16–19). We are reminded of the visiting fleet which received supplies in kind raised by an *ad hoc* levy on the community in the *Odyssey* (above, p.19). The anecdote illustrated not only Spartan virtues but also the strain

which the financial needs of a modern trireme fleet placed on the old system of funding.

A similar point was made by Herodotus' account of the Samian attack on Siphnos and a later attack by a Greek trireme fleet on Thasos. Both islands enjoyed exceptionally rich revenues from gold mines. Herodotus noted that the Siphnians, apart from dedicating a tithe to the gods, 'distributed among themselves the money which accrued each year' (3.57.1). They were badly defeated by the Samians and appear not to have recovered, providing only a solitary penteconter in 480 (8.48). The Thasians, by contrast, having survived an attack in 494, used their income to 'build long ships and surround themselves with a stronger wall' next year.[63] Since Athens later faced the same choice between communal distribution and public spending of mining revenue, these details are surely a pointed allusion to the changes in public finance which became necessary to survive in a world dominated by trireme fleets. More directly, Herodotus also cited the advice of Hecataeus to the rebels in the Ionian revolt: they could succeed only if they cashed in the treasures dedicated to Apollo at Branchidae (5.36.2–3). Already naval power imposed exceptional financial demands.

Thasos, then, had a publicly-funded navy at least ten years before Themistocles' naval programme in Athens. In 491, Corinth sold off 20 warships for a token sum, which implies that it had had a sizeable public navy for some time.[64] The late sixth-century Eretrian law which prescribed payment of wages to the crews of warships (above, p.27) indicates a level of public funding which makes it very likely that the five triremes which Eretria sent out in 499 to support the Ionian revolt (Hdt. 5.99.1) were also publicly-owned. Perhaps these cities were all pioneers, but the near-monopoly which the trireme enjoyed in naval war in 480 strongly suggests that they were part of a general trend, and that public navies were widely established in the Greek world by about 500 BC, even if many were rather small. Two major historical developments thus coincided in the late sixth century: Greek cities developed increasingly formal and extensive systems of public finance, without which it would not have been possible to adapt to the changes in naval warfare driven by Persian expansion, while these changes in

naval warfare in turn caused ongoing developments in public finance to accelerate rapidly, transforming Greece in the space of a generation, 525–500 BC.

* * *

Against this background we must understand the nature and development of public finance in Athens from Solon to Ephialtes. Homer shows that communal revenue and spending were well-established by the early seventh century, so that one would expect to find the same or more developed practices and concepts under Solon. It would not be surprising if his reforms of 594/3 marked a significant step in the institutionalization of public finance. The evidence of accelerating developments in the late sixth century suggests that, if the scholarly consensus about the impact of Themistocles' ship-building is correct, Athens was a generation behind the times – or else that the consensus is wrong and radical changes in public finance occurred during the reign of Hippias, 527–510, and the reforms of Cleisthenes, starting in 508/7 BC.[65]

3 Ham-Collectors and other Financial Institutions

A striking feature of Athenian institutions at the time of Solon is just how many officials were involved in financial administration. The Aristotelian *Athenaion Politeia*, lists as the 'great offices' under Solon 'the nine archons and the Treasurers and the Sellers and the Eleven and the Ham-Collectors' (7.3),[1] and of these only the archons and the Eleven were not primarily concerned with finance. A little later, we hear that there were also 48 officers called *naukraroi* who had financial responsibilities (8.3). The existence of most of these magistrates is confirmed by archaic evidence, and they probably added up to more than 70 officials engaged in raising, storing and distributing communal funds in kind, in bullion and after the mid-sixth century also in coin. This already quite large and developed financial apparatus became even larger and more complex after the reforms of Cleisthenes. This chapter analyses the status and roles of officials with financial responsibilities; their expenditures and revenues will be scrutinized later (in Chs 4 and 5).

TREASURERS, HAM-COLLECTORS, SELLERS AND RECEIVERS

The 'Treasurers' (*tamiai*) – variously described as treasurers 'of Athena', 'of the goddess', 'on the Acropolis' – were not in charge of public funds, nor were they merely treasurers.[2] The original sense of ταμίαι was 'housekeepers', and accordingly they were in charge of all aspects of the management of the temple of Athena on the Acropolis, including for

instance imposing fines on priestesses or attendants for incorrect use of the sacred precincts, as well as the administration of all the temple's revenues, property and dedications, which together probably amounted to the single largest concentration of wealth in archaic Attica. A broken plaque of *c.* 550 BC records a dedication by at least five and probably eight Treasurers. It is a notable feature of Athenian attitudes to finance, as well as cult, that the temple was not independently run by priests, priestesses or other dedicated personnel, but by a board of magistrates, perhaps two from each of the four civic tribes, annually appointed by lot from among members of the highest property class.[3] The temple's wealth might belong to the goddess, but it was evidently at the same time communal property, to be managed by public officials. Other temples in Attica presumably also had their own public treasurers, perhaps locally appointed, until their administration was centralized by the creation of a single board of 'Treasurers of the Other Gods' in 434 BC.

In classical Athens, the wealth stored in temples was available for use by the city through borrowing, at interest, from the deity in question. This is first attested in the 440s, by which time the custom was well-established: inscriptions record both large-scale public borrowing from the Treasurers of Athena to fund military action and small-scale private borrowing from the temple of Nemesis at Rhamnous, while at the same time a new cult statue of Athena was designed with the built-in option to remove and coin its gold plating to raise emergency funds.[4] Archaic evidence is limited to a single entry in an early sixth-century inventory from the temple of Artemis at Ephesus which appears to record an income of 40 minae from loans, but it seems likely enough that temple funds could be borrowed in the archaic period as well, and thus used for purposes other than cult or temple-building.[5]

Secular public funds[6] were managed by the *kolakretai* (κωλακρέται), 'Ham-Collectors'. Their quaint title suggests a very early origin. Its first element referred to the κωλῆ, the 'hams' of sacrificial animals which were commonly allocated to priests. Public officials, too, often enjoyed the right to special shares at sacrifices, and in Sparta the material privileges of the kings, apart from landed estates, consisted entirely

of such shares: the hides of all animals publicly sacrificed, the chines of all animals sacrificed during military campaigns, a double share of meat at all public meals, a sacrificial animal plus a quantity of barley and wine twice a month 'from the public fund' (ἐκ τοῦ δημοσίου), and most remarkably 'one piglet from every litter of pigs'.[7] The second part of the name is related to the verb ἀγρέω, 'capture, seize', or ἀγείρω, 'collect', used in Homer for gathering levies from the community (above, pp.18–19). A Spartan parallel is the title of the *hippagretai*, three officials who each 'collected' 100 men for the elite body of Hippeis; a magistrate called 'the *agretas*' is also mentioned in a late seventh-century Cretan law.[8] The Ham-Collectors were thus presumably in origin officials who collected the dues owed to kings and magistrates, and developed into treasurers who received all revenue that accrued to the city.[9]

They also distributed revenue; indeed it is only in this capacity that they are attested in the classical evidence, because by this time they had lost the role as 'collectors' enshrined in their name (see below). Archaic evidence for Ham-Collectors spending money comes from a law, cited in Androtion's *Atthis*, which decreed that

> to those who go as envoys to Delphi, the Ham-Collectors must give silver from the *naukrarika* as travel money and to cover whatever else they may spend (τοῖς δὲ ἰοῦσι Πυθῶδε θεωροῖς τοὺς κωλακρέτας διδόναι ἐκ τῶν ναυκραρικῶν ἐφόδιον ἀργύρια καὶ εἰς ἄλλο ὅ τι ἂν δέηι ἀναλῶσαι). (*FGrH* 324 F 36)

Since neither the *kolakretai* nor the *naukrarika* existed any longer in Androtion's own day, he was evidently citing an obsolete law, probably in his discussion of Cleisthenes' reform of the Ham-Collectors (F 5; see below). An archaic date seems certain, and a Solonian origin probable.[10] The Ham-Collectors' role in paying expenses, stipends and wages continued for most of the fifth century. In the absence of any other known magistrate who might have fulfilled this function, they must have been responsible for all expenditure from central funds in the archaic period.[11] These funds were probably not stored in a single treasury building but deposited in a number of temples.[12]

Remarkably, the law quoted by Androtion instructs the Ham-Collectors to pay the envoys' expenses from what is evidently a distinct fund, the *naukrarika*. Other archaic references to secular public funds

are not so specific: a number of reliably attested Solonian laws stipulated that fines, or part of fines, are to be paid 'to the public [treasury]' (εἰς τὸ δημόσιον), and the same phrase was used in inscriptions from the late sixth century onwards.[13] No other named fund is attested before the fourth century, when we encounter such funds as the *theorika* and *stratiotika*, 'for the spectators' and 'for the soldiers'. Every one of these later funds was named after the particular expenditure for which it was earmarked, and by analogy the archaic *naukrarika* too ought to have been a 'fund for the *naukraroi*'.[14] We shall see later that the *naukraroi* may indeed have been involved in conveying envoys to Delphi. For now, we need only note, first, that the existence of a dedicated fund indicates that the business of the *naukraroi* was of central importance to the city, and, secondly, that the earmarking of resources is by no means a self-evident practice but indicates a considerable level of development in public finance.

Uniquely among Athenian magistrates, the Ham-Collectors held office for less than a one-year term: after the introduction of the division of the administrative year into ten prytanies, they served for a single prytany, and we may guess that it had earlier been a single month. If under Solon there were eight at a time, as many as there were Treasurers of Athena, a total of 96 *kolakretai* would thus have served in any given year. This staggeringly high number suggests an attempt to share financial responsibility widely and to minimize the control over finance which any individual could exercise – the 'theft' of public property was an abuse about which Solon complained in one of his elegies.[15]

Alongside the Ham-Collectors, according to Aristotle, stood the Sellers (*poletai*) whose responsibility was the management of public assets. In classical Athens, the Sellers sold to private buyers the confiscated houses and land of those convicted in court, rented out public landed property including temple estates, and 'sold' for a fixed period the right to exploit silver mines and the right to collect certain taxes.[16] Although we have no other evidence for their existence in the archaic period, Aristotle presumably included them in his list of 'great offices' under Solon because they featured in Solon's laws, which he explicitly cited as evidence for other magistrates. The logic of separating the Sellers' role from the financial responsibilities of the Ham-Collectors was based, I

would suggest, on a perception already evident in Homer: the power to allocate communal resources lay with the community as a whole, while the power to levy and spend contributions lay with kings or magistrates. Different financial officials were instituted to represent these different sources of authority.

The Sellers, of whom there were presumably one or two per tribe, have a significant name which shows that the principle on which public assets were managed was not communal sharing or redistribution, but sale to the highest bidder, i.e. exploitation of assets for maximum public revenue, albeit without going so far as to organize direct exploitation of these resources by the State itself. The Sellers may, however, not yet have played their full range of classical roles under Solon. A later tradition claims that public properties were leased out by the local officials called *naukraroi* (below, p.45), while the leasing out of temple estates may have been done by the *basileus*, who later continued to direct the *poletai* in this business (*Ath. Pol.* 47.4). So the Sellers' functions may originally have been more restricted, perhaps confined to selling off confiscated property.[17] When Cleisthenes abolished the *naukraroi*, he may have centralized the management of public property by transferring to the Sellers the task of leasing it out. Perhaps he assigned responsibility for mines and taxes to them as well.

Cleisthenes also increased the boards of Treasurers, Ham-Collectors and Sellers to ten members each, one for every new civic tribe,[18] and probably created an additional board of ten, the Receivers (*apodektai*). The evidence for this comes from Androtion's *Atthis*, which according to Harpocration's *Lexicon* claimed that Cleisthenes 'instituted the Receivers instead of the Ham-Collectors' (*FGrH* 324 F 5). This cannot be literally true, since the latter still existed in the late fifth century, and it is unlikely that Androtion, an expert in matters of public finance, made such a blatant mistake. More probably, Harpocration misrepresented a statement by Androtion to the effect that Cleisthenes had established the Receivers to take over one side of the Ham-Collectors' responsibilities.[19] One reason for this change was surely to spread financial powers more widely still and limit opportunities for embezzlement; another reason may have been to cope with an increase in financial business resulting from centralization.[20]

After 508 BC, the 'great offices' thus included 40 financial officers, twice as many as the archons and the Eleven combined. Another ten were added in 478/7 BC with the creation of the board of 'Treasurers of the Greeks' (*hellenotamiai*) to manage the treasury of the newly-established Delian League which contained the 'tribute' paid by many of the allies, initially deposited on Delos.[21] This was strictly speaking not an Athenian but an international public fund, yet it paid for Athenian expenses which would previously have had to be covered by other means, as we shall see (pp.104–6).

At the highest level of government, then, numerous financial officers were active under Solon, and among the notable features of the system were the exercise of public control over the finances of temples; the differentiation of function between Ham-Collectors and Sellers; the earmarking of at least one fund for specific expenditures; and the strict limitation of power by allowing the Ham-Collectors only a one-month term of office. Cleisthenes' reforms increased the number of officers, the degree of differentiation and the level of centralization. Similar patterns emerge at a lower level of financial administration.

NAUKRAROI AND *NAUKRARIAI*: THE EVIDENCE

The officials known as *naukraroi* present a notorious problem, especially for those who believe that Athens had no public naval organization before Themistocles. The scholars who have treated the evidence in most detail have done so explicitly with a view to demonstrating its supposed inconsistency and unreliability.[22] In order to provide a more balanced perspective, we will separate the presentation and assessment of the evidence for *naukraroi* (in this section) from the interpretation of their functions (in the next section).

The Aristotelian *Athenaion Politeia* describes the following institutions as part of Solon's constitution but suggests that they had existed even earlier:

> There were four tribes, as before […] Each tribe was divided into three 'thirds', and there were twelve *naukrariai* in each. Put in charge of the *naukrariai* was the office of the *naukraroi*, given the task of dealing with

> the *eisphora*-levies and expenditures which arise. This is why in the laws of Solon which are no longer in use it is often written 'the *naukraroi* must levy' and 'spend from the naukraric silver'. (8.3)
>
> φυλαὶ δ᾽ ἦσαν δ′ καθάπερ πρότερον […] ἐκ δὲ τῆς φυλῆς ἑκάστης ἦσαν νενεμημέναι τριττύες μὲν τρεῖς, ναυκραρίαι δὲ δώδεκα καθ᾽ ἑκάστην: ἦν δ᾽ ἐπὶ τῶν ναυκραριῶν ἀρχὴ καθεστηκυῖα ναύκραροι, τεταγμένη πρός τε τὰς εἰσφορὰς καὶ τὰς δαπάνας τὰς γιγνομένας: διὸ καὶ ἐν τοῖς νόμοις τοῖς Σόλωνος οἷς οὐκέτι χρῶνται πολλαχοῦ γέγραπται, 'τοὺς ναυκράρους εἰσπράττειν', καὶ 'ἀναλίσκειν ἐκ τοῦ ναυκραρικοῦ ἀργυρίου'.

The author later reports that the institution was abolished by the reforms of Cleisthenes: 'he established demarchs with the same responsibility as the previous *naukraroi*; for he also created the demes instead of the *naukrariai*' (κατέστησε δὲ καὶ δημάρχους, τὴν αὐτὴν ἔχοντας ἐπιμέλειαν τοῖς πρότερον ναυκράροις. καὶ γὰρ τοὺς δήμους ἀντὶ τῶν ναυκραριῶν ἐποίησεν, 21.5). The implication is that the *naukrariai* were local administrative units, like the later demes, but since there were only 48, while there were later 139 demes which each as a rule corresponded to a distinct town, village or residential district, the *naukrariai* must have been artificially defined administrative regions which covered on average about three demes.[23] The phrase 'given the task of dealing with the tax-levies and expenditures which arise' and the legal clauses cited in support create the impression that the *naukraroi* were merely local executive financial officers, who implemented established procedures or decisions made by central authorities. In the same vein, some later lexica add that *naukraroi* 'lease out public properties'; they are 'those who collect revenue from the public properties; and *naukraria* are the places in which the properties are located'.[24]

A few years before *Athenaion Politeia*, Androtion's *Atthis*, written *c.* 340 BC, quoted the archaic law concerning the use of 'the fund for the *naukraroi*' by the Ham-Collectors, discussed above. Another pair of relevant phrases from Solon's laws, quoted in a very much later source, Photius' *Lexicon*, is unfortunately not very informative: 'if anyone disputes a *naukraria*' (ἄν τις ναυκραριᾶς ἀμφισβητῆι) and 'the *naukraroi* who, each in their *naukraria*' (τοὺς ναυκράρους τοὺς κατὰ ναυκραρίαν).[25] These clauses do at least vindicate Aristotle's claim that the institution was 'often' mentioned, and, in bringing up to five the

number of pertinent quotations or paraphrases from archaic laws, make the *naukrariai* the best-attested institution after the archons in contemporary evidence.[26]

So far, the *naukraroi* seem humble local magistrates, much like the later demarchs. Photius, however, also quotes yet another fourth-century history, Cleidemus' *Atthis*, which offers a first hint that there was more to these officials than Aristotle suggests:

> Cleidemus says in his third book that when Cleisthenes created ten tribes instead of the old four, he at the same time assigned them [i.e. the Athenians] to fifty sections, which they called *naukrariai*, just as now they call *symmoriai* the groups formed by the division into a hundred sections. (*FGrH* 323 F 8)
>
> Ὁ Κλείδημος ἐν τῇ τρίτῃ φησὶν ὅτι Κλεισθένους δέκα φυλὰς ποιήσαντος ἀντὶ τῶν τεσσάρων, συνέβη καὶ εἰς πεντήκοντα μέρη διαταγῆναι αὐτούς, ἃ ἐκάλουν ναυκραρία<ς>, ὥσπερ νῦν εἰς τὰ ἑκατὸν μέρη διαιρεθέντα<ς> καλοῦσι συμμορίας.

On this evidence, then, the *naukrariai* had functions which the demes did not take over, and which were significant enough for the *naukrariai* as units to be retained in a different form by Cleisthenes even after he abolished the *naukraroi* as officials. The 'symmories', with which the new *naukrariai* are compared, were a vital element in fourth-century public finance. They were groups of rich men, established in 378/7 BC as units liable to pay the war tax (*eisphora*). From 358/7, symmories also provided the men who captained and partly funded Athens' warships; whether these were a separate set of symmories or simply the war tax-symmories put to different use is a matter of debate. Cleidemus wrote before Androtion, probably no later than *c.* 350 BC, but we do not know whether it was before or after 358/7, so that we cannot be sure whether he compared the *naukrariai* to tax symmories or (also) to naval symmories.[27] Either way, Cleidemus claimed that the *naukrariai* did not lose all their functions to the demes, but continued to exist as associations of rich men liable to pay war taxes or fund and captain war ships, or both.[28]

A second sign that the *naukraroi* were more than local financial officers is their odd name. The first element, ναυ-, occurs in countless Greek compound words and always clearly means 'ship' (ναῦς); the

second element is more obscure but must be related to verbs such as κρατέω and κραίνω, 'to have power', 'to rule over'. The word means 'ship-head', i.e. ship's captain or ship owner. This etymology is suggested by ancient lexica, confirmed by modern philologists and adopted by etymological dictionaries. The common classical term for the captain or owner of a ship, ναύκληρος, is in fact simply a later form of the same word: a vowel shift from *alpha* to *eta* occurred generally in the Ionian dialect, and the change from *rho* to *lambda* was the result of a process known as dissimilation.[29] The older form of the word was presumably retained to distinguish the officials called 'Captains' from ordinary private commanders and owners of ships.

Puzzlement over why ships' captains should play such a prominent role in the administration of archaic Attica has led some scholars to suggest an alternative etymology, which derives ναυ- from ναός, 'temple'. Several others have responded by listing numerous reasons why this derivation is linguistically implausible and unsupported by the evidence, and no one has argued in its support. Yet the appearance of this alternative etymology has nevertheless encouraged a few scholars to conclude that the connection between *naukraroi* and ships is open to question.[30] But this is not a logical conclusion to draw, given that no one has found any merit in the new etymology and no one has demonstrated any weaknesses in the older one. The only plausible meaning of *naukraroi* continues to be 'Captains', and the question we must answer is why this should have been the title of these magistrates.

An ancient answer to this question, and a third sign that the *naukraroi* were not merely financial officers, is found in Julius Pollux's *Lexicon*, of the second century AD, which is superficially similar to the account in the *Athenian Constitution* but differs in detail and must therefore draw on another source. Under 'demarchs', Pollux writes:

> These men, who governed the demes, were for some time called *naukraroi*, when the demes too were known as *naukrariai*. A *naukraria* was for some time the twelfth part of a tribe, and there were twelve *naukraroi*, four in each 'third'. These men voted on the tax-levies in the demes and the expenditures from them. Each *naukraria* provided two horses and one ship, after which it was probably named. (8.108)

> Οὗτοι οἱ κατὰ δήμους ἄρχοντες ἐκαλοῦντο τέως ναύκληροι, ὅτε καὶ οἱ δῆμοι ναυκράριαι. ναυκραρία δ' ἦν τέως φυλῆς δυοδέκατον μέρος καὶ δυόδεκα ναυκράριοι ἦσαν, τέσσαρες κατὰ τριττὺν ἑκάστην. τὰς δ'εἰσφορὰς τὰς κατὰ δήμους διεχειροτόνουν οὗτοι, καὶ τὰ ἐξ αὐτῶν ἀναλώματα. ναυκραρία δὲ ἑκάστη δύο ἱππέας παρεῖχε καὶ ναῦν μίαν, ἀφ' ἧς ἴσως ὠνόμασται.

Apart from spelling out the relation between *naukrariai* and 'thirds', which Aristotle does not do, Pollux credits them with a more extensive role than Aristotle suggests. Instead of being mere executive officers, his *naukraroi* have the power to make decisions: 'they voted' (διεχειροτόνουν) on taxing and spending.[31] And he adds a military role to the remit of the *naukraroi*: they levy horses and ships as well as money. An anonymous lexicon similarly defines *naukraroi* as 'those who provided the ships, acted as captains[32] and were subordinate to the polemarch' (*Lexica Segueriana* 1.283.20); it also identifies the location of one *naukraria* as Cape Colias (1.275.20).

Where these lexica found their information, we do not know. One could argue that the notion of *naukraroi* providing ships was no more than a guess based on their title.[33] But that does not explain the origin of the other details, which were certainly not based on simply projecting later institutions back into the archaic past: the polemarch lost his military role early in the classical period, and the classical cavalry was organized on a very different basis.[34] These details must thus come from a source – such as Cleidemus, Androtion or a later *Atthis* – which attempted to reconstruct the workings of the archaic *naukraria*, and arrived at a view different from Aristotle's, namely that it was an institution with decision-making powers which raised not only taxes but also cavalry and above all ships.

Some corroboration for this ancient reconstruction comes from Herodotus, who implied that before 491 BC Athens had a fleet of 50 ships (6.89), which fits exactly with Pollux's statement that each *naukraria* provided one ship, since there were 50 *naukrariai* at the time according to Cleidemus. One could of course dismiss this as a coincidence, or even argue that Cleidemus inferred his number from Herodotus; in the latter case it would still follow that Cleidemus regarded the *naukrariai* as units providing ships, analogous to symmories with naval functions.

Another passage in Herodotus provides our fourth and final indication that archaic *naukraroi* amounted to more than Aristotle suggested: it credits them with great power at a very early date. Herodotus briefly alludes to the earliest recorded event in Athenian history, a failed *coup d'état* sometime in the 630s or 620s by Cylon, which ended when his supporters were massacred in breach of an agreement to surrender: 'the chiefs of the Captains (οἱ πρυτάνιες τῶν ναυκράρων), who governed Athens at that time, made them get up [from their refuge at the altar of Athena], but the Alcmeonids were blamed for killing them (5.71.2)'.

This version of the story is notoriously contradicted by Thucydides, who says that after an initial general mobilization the Athenian people left the handling of the *coup* to the discretion of 'the nine archons […] who at that time dealt with the majority of civic affairs'. It was these archons and their men who killed Cylon's supporters despite promising them safe conduct, and as a result their descendants, the Alcmeonid family, were known as 'the accursed and offenders against the goddess' (ἀλιτήριοι τῆς θεοῦ, 1.126.7–11). Implicit in Thucydides' version is that Alcmeonids were somehow dominant among the archons, and later accounts added that Megacles, head of the Alcmeonid family, was chief archon at the time.[35] Distinguished scholars have the declared the conflict between these versions of the story 'beyond resolution'[36] and we might have had to leave it at that if it were not for a small piece of evidence, never yet discussed in this connection, which throws new light on the tradition.

This crucial evidence comes from a potsherd, used 488–485 BC as a ballot to vote for the ostracism of Xanthippus, father of Pericles. Uniquely, it is inscribed in verse:

ΞΣΑΝΘ[ΙΠΠΟΝ …]ΦΕΣΙΝ ΑΛΕΙΤΕΡΟΝ ΠΡ[ΥΤ]ΑΝΕΙΟΝ
ΤΟΣΤΡΑΚ[ΟΝ ΑΡΡΙ]ΦΡΟΝΟΣ ΠΑΙΔΑ ΜΑ[Λ]ΙΣΤ' ΑΔΙΚΕΝ.[37]

The translation of this text is somewhat uncertain. Its first editor, A.E. Raubitschek, read the last two words of line 1 as accusatives singular (ἀλειτερὸν πρυτανεῖον), so that a literal translation would be:

Xanthippus the offender, against the *prytaneion*, says
this *ostrakon*, the son of Arriphron, has committed the greatest injustice.[38]

This is not impossible, but the tortuous word order and the unparalleled notion of 'injustice against the *prytaneion*', i.e. the building containing the public hearth, make it hard to accept. Subsequently most scholars have preferred to interpret ἀλειτερον πρυτανειον as genitives plural, which gives:

> Xanthippus of the offending *prytaneis*, says
> this *ostrakon*, the son of Arriphron, has committed the greatest injustice.

On this view, the 'offending *prytaneis*' are usually interpreted as an unpopular board of officials which included Xanthippus.[39] This is easier to accept, but overlooks the significance of the uncommon word ἀλειτερον, which, as Raubitschek noted, was strongly associated with Xanthippus' notorious in-laws, the Alcmeonid 'offenders' (ἀλιτήριοι). This association is confirmed by several more recently published *ostraka* of the time which also allude to the ancient curse. Most clear-cut are three ballots against Megacles, the current head of the Alcmeonid family, in person. He is at the receiving end of all sorts of abuse concerning his wife, his horses, even his hairstyle, but one sherd calls him Κυλόνεος, 'the Cylonian', and two refer to him as ἀλειτερός, 'the offender'.[40] The word 'offender' – not found on any other *ostraka* – was evidently enough to trigger an association with the story of the Alcmeonid curse, which remained a lively part of political propaganda in the 480s.

I suggest that we should take the best of both interpretations, and combine the translation 'Xanthippus of the offending *prytaneis*' with the insight that the adjective 'offending' could not fail to suggest the Alcmeonids. We thus conclude that 'the offending *prytaneis*' was another way of saying 'the Alcmeonids',[41] who according to the tradition reported by Herodotus did indeed offend against Athena in their capacity as *prytaneis*, namely '*prytaneis* of the *naukraroi*'. The potsherd simply alluded to the same reason for the ostracism of Xanthippus as was cited for the expulsions of his father-in-law Cleisthenes in 508 and his son Pericles in 432: the family to which they belonged had once committed sacrilege and was 'accursed'.[42] The *ostrakon* thus shows that there was a genuine early tradition which blamed the massacre of Cylon's supporters on the Alcmeonids as 'chiefs of the *naukraroi*', rather than as archons.

In reporting this story, classical historians changed it. The most intense discussion of the Alcmeonid curse within the lifetimes of Herodotus and Thucydides took place in 432 BC, when the Spartans made a demand for the expulsion of the accursed a pretext for war against Athens, and both historians' accounts of Cylon's coup were surely influenced by the terms of this debate. At the time, the *naukraroi* no longer existed, which will have made the exact relation between *naukraroi*, Alcmeonids and massacre, as reported in tradition, difficult to understand. All evidently agreed that those who dealt with Cylon must have been the supreme magistrates. One solution, adopted by Thucydides, was to ignore the obscure tradition and argue that the Alcmeonids were guilty because they were dominant among the archons, all-powerful at the time. The other solution, adopted by Herodotus, was to conclude that the *naukraroi*, not the archons, had once been in charge of Athens. He and others may well have favoured this scenario because it allowed them to suggest that the Alcmeonid family, whom Herodotus praises at length (6.121–31), were not really responsible for the massacre: the arcane *naukraroi* had been in charge of the affair, yet it was the Alcmeonids who somehow ended up being blamed.[43]

If the versions of Herodotus and Thucydides were shaped by the political debate of 432 BC, the older version of the story as attested by our potsherd must go back to similar debates of 508, when Spartan troops arrived and expelled 700 households of the Alcmeonid family and their supporters from Athens as accursed.[44] If the story had been invented any later, when the *naukraroi* had lost most of their power, they would not have been credited with a leading role in opposing Cylon. Whether the story accurately represented events and institutions of the seventh century BC, we cannot say, but it does show that before 508, the *naukraroi*, or at any rate their chiefs, were regarded as officials who played a leading national, not just local, role.

What role might this have been? Given an otherwise unanimous tradition that the archons had been Athens' supreme magistrates ever since the end of monarchical rule, it is unlikely that the chiefs of Captains had really 'governed Athens' in the seventh century.[45] More feasible is the theory that Herodotus' 'then' (τότε) did not mean 'in those days' in general, but at the moment of Cylon's coup specifically: the *naukraroi*

may have temporarily deputized for the archons because the latter were away, attending the Olympic Games, or because they had been appointed as mediators in this particular conflict.[46] Most probably, however, the archaic oral tradition did not specify the position of the Captains, which was then familiar to all, and the notion that they were supreme magistrates was merely Herodotus' best guess, an attempt to make sense of a tradition no longer fully understood. Our own best hope of reconstructing the role of the chiefs of the Captains is to set them in the context of the story of Cylon. As Thucydides says explicitly, and the other versions of the story presuppose, the first response to Cylon's attempt to seize power by occupying the Acropolis was a general mobilization of Athenians to lay siege to Cylon's forces (1.126.7); after a few days, the majority of people drifted away, leaving the siege in the hands of the authorities. The most obvious role for the 'chiefs' in this context is surely as military officers, who mobilized the general levy and later led the remainder of the troops in committing a massacre.[47]

Such a role would neatly complement the military functions implied by the name of the *naukraroi* and attributed to them by later lexica: they mobilized not only ships and cavalry, but also the citizen infantry, in each case under the supreme command of the polemarch. One may imagine each Captain commanding a levy from his *naukraria*; and, for example, one of the four Captains in each 'third' acting as 'chief' of that unit, creating a presiding committee of twelve – like the board of ten generals (*strategoi*) under the polemarch created in 501/0 BC.[48] A closely related function, mentioned by one late source, was to mobilize the local people for the annual procession at the Panathenaic festival.[49] This was probably already an armed parade in the archaic age, as it was in the classical period; it also featured a ship on wheels, carrying an offering to Athena, which was hauled halfway up the Acropolis.[50]

Such is the evidence for the *naukraroi*, *naukrariai* and *naukrarika*. The titles 'Captains', 'Captaincies' and 'Captain's Funds' point to a naval function; the story about their part in the Cylon affair, which goes back at least to the sixth century, implies an important national role, most probably as military officers; the quotations from Solon's laws indicate financial responsibilities. All of this contemporary archaic evidence fits

well with what is said about the institution in fourth-century local histories of Athens, and in later lexica which drew at least some of their information from such histories. The overall picture is of officials who combine financial and military, local and national functions. Within this picture, however, we see a notable tension between the sources that suggest that *naukraroi* were powerful figures with a range of roles, and *Athenaion Politeia* which mentions only their local financial responsibilities and suggests that they amounted to no more than the later demarchs.

CAPTAINS AND CAPTAINCIES: AN INTERPRETATION

The preceding discussion has shown that ancient accounts of the *naukraroi* are essentially consistent and in large part demonstrably based on contemporary archaic evidence. The implications for the organization of the Athenian state and public finance in the sixth century deserve careful investigation, even if they conflict with ancient and modern historical models. Reconstructing the responsibilities of the Captains is simple enough; demonstrating the historical plausibility of this reconstruction will require rather more discussion.

Under Solon, a Captain's main role was evidently to mobilize and command military forces from his Captaincy in the event of war: one ship with crew, two horsemen, or a general levy of infantry. He also led the local contingent in the Panathenaic procession. It is highly likely that in Athens, as elsewhere in Greece (above, pp.31–2), warships were privately owned and that the ship which the Captaincy provided was the Captain's own penteconter (below, p.64). A Captain's main financial role was to collect taxes, specifically *eisphorai*, as both Aristotle and the tradition represented by Pollux say, which in classical Athens were 'war taxes', irregular *ad hoc* levies for the specific purpose of paying for military campaigns. It seems obvious that a Captain thus levied taxes to fund the expeditions for which he raised troops – though to what extent and how tax revenues paid for warfare is a more difficult question, to which we shall return (pp.84–91, 129–31,

below). His other financial role was to collect regular local revenues – only rents from public property are mentioned – which may have covered regular expenditures on such things as the Panathenaic procession and the sending of Athenian representatives to festivals in one of the 'sacred' ships.[51]

The core of the Captains' responsibilities was thus the organization and finance of warfare, with logical extensions into the use of troops and ships for ceremonial purposes.[52] The differentiation of function between financial and other magistrates which we find among the 'great offices' was evidently not replicated at this level, where finance was among a range of responsibilities which fell to a single official.

Although they administered local districts, the Captains were part of central government rather than strictly 'local' officials. We have almost no information about what formal or informal organization existed at the level of the deme community before Cleisthenes, but the Captains are never credited with any such function, and they certainly did not, for instance, exercise judicial authority at this level, which we are told was assigned to 'deme judges' by Peisistratus.[53] Conversely, the Captains did have a decision-making role in central government: the story of the Cylonian affair implies that their Chiefs shared decision-making power with the polemarch – or else they could not have been blamed for the massacre – so that Pollux was probably right to credit them also with the right to 'vote' about raising and spending taxes. We may infer that the Captains, or at least their Chiefs, met with the polemarch to discuss military matters including finance; their proposals were presumably subject to ratification by the Council(s) and Assembly. The 48 *naukrariai* thus did not represent the local government of divisions of Attica which had developed organically, but a central structure of government as artificial as the 'tribes' and 'thirds' of Cleisthenes' reforms, superimposed on local communities for military and fiscal purposes.

Strictly speaking, nothing is known about how Captains were appointed, but if they were required to supply their own penteconters for naval expeditions, there cannot have been many candidates. The post will have been held year after year, or indeed for an indefinite term, by the owner of the best ship in the district.[54] The phrase 'if

anyone disputes a *naukraria*', quoted without context from a Solonian law, may suggest that there was a procedure by which a would-be Captain could challenge the incumbent for his position.[55] Even if, then or later, the Captain did not provide his own ship, he must have been responsible for many of the costs, like the later trierarchs, and, like them, belonged to the richest 5 per cent or so.

If this reconstruction is right, and Captains were once powerful officials with a wide range of functions, why did *Athenaion Politeia* portray them as no more than proto-demarchs? Part of the answer is that the Captaincy was quickly forgotten once it was abolished: its military role was barely remembered by the late 430s, as we have noted. By 350 BC, the Captaincy will have been almost completely obscure, and our fourth-century sources must have reconstructed its nature on the basis of very limited archaic evidence. This left room for interpretation, and one can see why a short account such as Aristotle's might have mentioned only financial functions, amply attested in Solon's laws, while more detailed histories of Attica by Cleidemus and others may have discussed the Captains at length and included military functions which were perhaps less well-attested.

What is more, the author of *Athenaion Politeia*, whether Aristotle or one of his students, shared the anti-naval bias of many of our sources and was accordingly inclined to play up the financial aspects of the Captaincy while ignoring its naval dimension. Unlike his teacher Plato, who wanted to do away with navies altogether on the grounds that they gave too important a role to the lower classes, Aristotle tolerated naval power as a necessary evil, but he was happy to accept the view that Athens had been a land-based power before Themistocles' ship-building programme. Indeed, he went so far as to argue that the new navy only began to have a detrimental political impact in the late 460s; until then, Athens had been 'well-governed'.[56] Given such views, he will have been reluctant to accept that naval organization had been a central element already in the much-admired constitution of Solon.

Some of the other historians of Attica had different political views and took a different line on the Captains. Whereas *Athenaion Politeia* claimed that the richest men in Athens had both built the fleet and made the victory at Salamis possible by generously paying the wages of the crews,[57]

Cleidemus' *Atthis* said that the rich had tried to hide their money, which had then been confiscated to pay the crews (*FGrH* 323 F 21). This implies an anti-elite, pro-democratic perspective which would welcome any evidence that archaic Athens had already had a navy in which the common man played his part. Cleidemus accordingly also offered what Plutarch called a 'remarkably original' account of secret ship-building by Theseus and a great naval victory over Minos, the legendary first thalassocrat (F 17; Plut. *Theseus* 19.8). In this context, Cleidemus' insistence that after Cleisthenes' reforms the Captaincies played a part similar to later symmories is best explained as an allusion to the naval as well as the fiscal role of these symmories: he surely argued that Captaincies still equipped ships after Cleisthenes, and that under Solon they had had an even wider range of military and financial functions. In short, pro-democratic writers credited the Captains with naval and military roles – which are confirmed not only by the title *naukraroi* but also by the verses on the Xanthippus-*ostrakon* – but Aristotle and other authors with an anti-democratic bias were inclined to omit these.

This leaves us with the question whether it is credible that archaic Athens had this level and kind of military and financial organization, a relatively complex system which revolved around the provision of ships. There are certainly plenty of historical parallels for such systems in comparatively little-developed States, specifically in medieval northern Europe. Here we commonly find territories divided into local units with an obligation to provide warships. A seventh-century AD law of the Hebridean kingdom of Dalriada specifies numbers of troops to be levied from each local unit and adds 'plus, for sea-voyaging, two seven-benchers from every twenty houses'. Anglo–Saxon England was divided into *scypsokes*, 'ship-districts', probably covering 300 hides of land, which provided a vessel each to the king's navy. The twelfth-century Swedish *skiplag,* Norse *skipreid* – a unit which reached inland from the sea 'as far as the salmon swims' – and Danish *skipaen* were all similar institutions. Such units provided not only ships, but also manpower and/or taxes to pay for ships and crews.[58]

Some tantalizing evidence suggests that parallel institutions existed closer to home in archaic Greece as well. Once upon a time, according to Plutarch, Miletus was governed by a group of rich men known as

aeinautai, literally 'permanent seamen', so called because they used to have their meetings at sea (*Mor*. 298cd). What may lie behind this story is an office much like that of the Captains: wealthy men who were under a 'permanent' obligation to captain a ship for the Milesian navy and whose function entailed considerable political power. *Aeinautai* are also known from classical Eretria and Chalcis, where they set up inscriptions which unfortunately do not tell us anything further about the nature of their position.[59]

Miletus, Eretria and Chalcis had a long and distinguished maritime history, and so did medieval Scandinavian states, with their history of overseas raiding and conquest. The mainstream literary tradition claims that archaic Athens was not a sea-power, and thus suggests that the city was not likely to develop institutions centred on the navy. Several scholars have sought to support this impression by counting the number of attested military campaigns and concluding that archaic Athens rarely engaged in any kind of war.[60] But the historical record, based largely on oral tradition, is of course far from complete and absolute numbers are meaningless; in relative terms, the number of attested archaic Athenian campaigns almost matches that of Sparta and greatly exceeds that of any other Greek state. What the record does show is that archaic Athens fought aggressive wars overseas long before Themistocles, while overland campaigns were less common and almost always purely defensive.

The intermittent but ferocious war against Aegina which was the ostensible reason for Themistocles' ship-building went back at least to *c.* 505 BC, and was ultimately traced to a semi-legendary past when Athens had invaded the island in order to retrieve some stolen cult statues.[61] Despite the ongoing threat from Aegina, the Athenians sent a substantial number of ships to join a raid on Sardis in 499 (Hdt. 5.97, 99–103) and their entire fleet to attack Paros in 489 BC (Hdt. 6.123–6). Around 500 BC, Athenian settlers in the Chersonese conquered the island of Lemnos (Hdt. 6.104, 136–40). Most remarkable was the Athenians' response to coming under attack from several directions in 506 BC: instead of trying to recover the border villages which had been occupied by Boeotian infantry, they chose to retaliate for raids on the Attic coast by mounting a war of conquest against overseas Chalcis, an enterprise which must

have involved numerous warships, although Herodotus does not mention these.[62]

Athenian naval activity is also prominently attested in previous generations, during the reigns of Peisistratus and his sons, 546–510 BC. The occupation of Sigeum on the Hellespont and its defence against numerous counter-attacks by the major power in the region, Mytilene, was perhaps the major Athenian war effort of this period (Hdt. 5.94). It was also at this time that Athenian volunteers settled in the Chersonese on other side of the Hellespont, ostensibly to help the natives fight off Thracian incursions. Significantly, they dealt with the Thracian threat by building a wall across the isthmus, and immediately launched an aggressive overseas campaign against Lampsacus (Hdt. 6.34–8). Peisistratus imposed regime change on the island of Naxos, a significant military and naval power at the time, and intervened in Delos to stage a 'purification', which probably entailed the use of force and certainly staked a claim for Athens as the leading naval power in the Aegean against stiff competition from Samos.[63] The war against Megara which dominated the early stages of Peisistratus' career, in the 560s, is notable because the two cities, although they shared a border, appear to have fought the entire conflict by means of naval raids, so far as one can tell from later tradition.[64] Between Athens and its northern neighbour Boeotia no war was apparently fought until 519 BC, when the Athenians formed an alliance with Plataea and extended their border at the expense of Thebes in the only land-based offensive which they are known to have conducted in the archaic period.[65]

The evidence for naval activity in the second half of the sixth century is clear enough to have persuaded some scholars that a financial and military organization centred on *naukraroi* might have been instituted by Peisistratus.[66] Its existence even earlier, under Solon, however, has generally been deemed inconceivable: Athens' long unsuccessful struggle, *c.* 600 BC, to take the island of Salamis from Megara does not seem to suggest a naval power, and later tradition only reinforces that impression by claiming that it was a force of volunteers on a fleet of fishing-boats which eventually did conquer Salamis.[67] Yet Athens' difficulty in defeating Megara must be seen in context: the city was torn apart by violent political rivalry and popular unrest in the years around

600 BC, which inevitably undermined its military capacity, and it was nevertheless also waging another hard-fought overseas war at Sigeum, which it then occupied for the first time.[68] In the circumstances, Athens' loss of Salamis hardly constitutes evidence for a lack of naval resources and ambitions.

As for the tradition that the island's final conquest under Solon was achieved by a fleet of fishing boats and a single thirty-oared triaconter, this can hardly be historical. The implication that Athens was unable to launch even a single penteconter, and just a single oared galley of any kind, is impossible to believe. This is just too unwarlike a fleet for any city, however limited its resources. An explanation of the tale, I would suggest, lies in the appearance of the sole triaconter, an unusual type of vessel, which is mentioned elsewhere as the venerably ancient 'sacred ship' which took Athenian representatives to the festival at Delos.[69] We are told that the conquest of Salamis was symbolically re-enacted every year by a ship sailing over and a single armed man jumping ashore and running to a nearby sanctuary while shouting as if charging into battle (Plut. *Sol*. 9.4). This ship must have been the thirty-oared sacred ship, and one can easily imagine a flotilla of fishing-boats accompanying it to join in the patriotic celebrations. This story about Solon's conquest of Salamis was thus surely based, not on a record of the actual campaign, but on the later annual ceremony commemorating the victory. It tells us nothing about the state of Athens' actual fleet.[70] Solon's reliance on volunteers, finally, is unsurprising since they were not just to fight over the new territory, but to settle there. It does not follow that around 600 BC appealing for volunteers was the only way to mobilize naval or other forces. Military activity in Solon's day, then, does not preclude the existence of a naval organization, and one might argue that Athens' success at Sigeum is evidence for its early commitment to overseas expansion.

For earlier centuries the historical record is silent, and it is notable that Athens, unlike so many other Greek cities, did not found colonies at the time. But naval weakness is not the only possible explanation for this phenomenon, and it seems clear that the Athenians did engage in private naval raiding. A law of Solon's includes 'bands travelling in search of booty or for the sake of trade' in a short list of associations allowed to make legally binding agreements, which shows that private raiding was

both a common and a legitimate activity. The prevalence of images of fighting around beached ships on monumental Geometric vases used as grave markers suggests that this was true already by *c.* 750 BC.[71]

None of the evidence for archaic military operations at sea proves, in itself, that Athens had a formal naval organization: it is in principle possible that all these campaigns were fought on a strictly voluntary basis with whatever manpower and resources could be mobilized *ad hoc*. But the evidence does show that by 483 BC Athens had a history of nearly three centuries of naval raiding and more than a century of overseas conquest. There is thus no obstacle to accepting that the Captaincies were what their name, the sources, and historical analogies suggest, and we may conclude that by the time of Solon Athens did indeed have a formal, centralized system for raising ships, troops and funds.[72]

Cleisthenes' reforms to some extent decentralized this system, but only to create a more complex, extensive and differentiated apparatus to serve its functions. He may have transferred the leasing out of public property from the Captains to the central control of the Sellers (above, p.43), but the collection of revenues from public property and the levying of *eisphora* taxes went from the Captains to the demarchs.[73] Cleisthenes may have created a new formal (elected) office of demarch where previously there had only been informal leadership of local communities, as Aristotle implies, or perhaps he merely assigned new responsibilities to already existing local officials. The demarch, often assisted by a treasurer (*tamias*), managed the purely local finance of the deme itself, too.[74] Local citizen registers, the so-called *lexiarchika grammateia*, which recorded the ownership of property and the liability to serve in the militia and to pay *eisphora* taxes which came with it (below, pp.94–5), were now kept by the demarchs, rather than by the Captains, who presumably relied on similar records in exercising their military and fiscal functions under Solon.[75] The reallocation of these tasks to local officials meant devolving a good deal of power onto each community, but also nearly tripled the number of officials involved in the process.

Responsibility for mobilizing and commanding those citizens who were liable for military service was in 501/0 BC transferred from the Captains to new elected military officials: ten *strategoi* in overall command and ten *taxiarchoi* to command the tribal regiments, who in turn appointed

an unknown number of subordinate officers, the *lochagoi* (*Ath. Pol.* 22.2; 61.1–3). Although these military officials were not specialists, the separation of the command role from the financial and administrative functions of the Captains was a major step towards the further differentiation of the structure of government and further expanded the personnel involved.

This leaves only one function of the Captains unaccounted for, namely the provision of warships. It stands to reason that it was this responsibility which fell to the 50 symmory-like *naukrariai* which Cleisthenes established according to Cleidemus. Details of how these new *naukrariai* operated will be discussed in the next section; they must have been abolished when Athens took yet another step towards centralization, assigning the building and maintenance of warships to central bodies of government, probably in the mid-470s (below, p.68).

4 Ships, Soldiers and Sacrifices: Public Spending

By the mid-fifth century BC, 6,000 jurymen, 700 magistrates, 500 councillors and a number of prison warders received regular pay in Athens. Nearly 4,000 militia soldiers served for pay in standing forces of archers, cavalry and heavy-infantry guards for the town and its dockyards; an unknown number of war orphans received a dole. Almost 12,000 men were on full or nearly full public pay, according to Aristotle (*Ath. Pol.* 24.3), or one-fifth of about 60,000 adult male citizens. Opponents of democracy wanted nothing more than to ban such public wages; the common man, as caricatured in comedy, wanted nothing more than to collect his cash:

> The sweetest thing of all […] is going home with my pay. When I get back everyone makes me welcome on account of my silver. First my daughter washes and anoints my feet, leans in to kiss me, calls me 'Daddy' and tries to fish out the three-obol coin with her tongue. Meanwhile, my old lady butters me up by bringing over a light barley-cake and then she sits beside me and insists 'Eat this – get it down you'. That really cheers me up![1]

Pay for jurymen and office-holders was a new phenomenon of the 450s, and many scholars believe that pay for citizen soldiers and oarsmen was not much older.

However, the existence of the Captains, and of a dedicated public fund 'for the Captains' (*naukrarika*; above, pp.41–2), shows that spending on warfare was a priority already in archaic Athens, even if the costs of war under Solon were relatively low. As we have seen (in Ch. 2), public expenditure was transformed elsewhere in Greece by the adoption of the trireme and the introduction of wages for military service, *c.* 525–500 BC, and a key question is whether in Athens this happened at the same time or, as the consensus has it, a generation or so later.

SHIPS

Under Solon, warships were almost certainly still provided by private owners, as elsewhere in Greece until *c.* 530 and indeed in early Scandinavia: 'the magnates of Halland [were] responsible for a *skipaen* each […] and made their *own* ships available for this purpose' (Lund 1997: 197). Even in and after 480, when a publicly-owned navy undoubtedly existed in Athens, a few men still served in their private warships,[2] and it is generally agreed that this had previously been the norm in Athens as elsewhere in Greece, with the possible exception of a few 'sacred ships' used for diplomatic and religious missions.[3] Some scholars argue that archaic Athenians owned only small boats and trading vessels which served as a 'coastguard',[4] but we have already traced back Athens' long tradition of private naval raiding and found that the city was by Solon's time engaged in overseas conquest as well, so we have no reason to doubt that the ships provided by the *naukraroi* were fifty- or hundred-oared penteconters.

A reliance on privately-owned warships may explain why the Alcmeonid family and their supporters were prominent among the *naukraroi*, as the archaic tradition about their massacre of Cylon's men implies. In the generation after Solon, the Alcmeonids were known as leaders of 'the Athenians of the coast' against 'the Athenians from the plain' (Hdt. 1.59.3), of the 'coast-dwellers' (*paralioi*) against the 'plainsmen' (*pedieis*), each faction 'named after where they farmed' (*Ath. Pol.* 13.5). This regional division has puzzled scholars, and it has even been rejected as unhistorical,[5] but the coastal faction can be understood as a coalition of landowners who lived sufficiently near the coast to own ships, or at any rate to have a close interest in raiding and trading, against a coalition of landowners from central Attica who did not possess ships. If so, the Alcmeonid family, as leaders of this faction, will have owned many of the best warships in Athens, which in turn will have ensured their prominence among the 'chiefs of the *naukraroi*'. The ship-less landowners of the plain would have been unable to attain these leading positions, while nevertheless being obliged to contribute to the 'fund for the Captains', and this will have fuelled the rivalry between the two factions.[6]

If we were to accept Herodotus' implicit claim that Athens had no triremes before 483 BC, the Athenian fleet might have continued to consist

of private penteconters until this date. There is, however, much evidence – not least evidence provided by Herodotus himself – to show that this cannot be right. First of all, Herodotus' account is inconsistent, since he adds that in 481/0 the Athenians decided to build ships in addition to the 200 which they had constructed in 483 (7.144.2), yet at the end of 480 they still had only 200 triremes.[7] Evidently, Herodotus carelessly projected the final figure of 200 triremes back to the original building programme, which by his own account must actually have constructed fewer ships. We must therefore give preference to the common alternative tradition that only 100 ships were built in 483.[8] The remaining 100 triremes were thus either all built in 481/0,[9] or else fewer were constructed in that year and Athens already possessed dozens of triremes before 483. The latter scenario is favoured by the general probability that Athens would not have lagged far behind the rest of the Greek world and by a good deal of specific evidence.

For its expeditions against Aegina and Paros, *c.* 491 and 489, Athens launched 70 vessels, which Herodotus simply called 'ships' (νέες, 6.89, 92.1, 132). This is the term he normally used for triremes, including the '200' built by Themistocles,[10] but of course it could mean other kinds of ship as well. The excuse for attacking the Parians was that they had 'supplied triremes' to the Persian fleet which occupied the island in 490 before going on to attack Athens (6.99, 133.1): it would be strange if Athens had no triremes when tiny Paros did.[11] The Aeginetans must have had a large number of triremes by 520, when they defeated the fleet of the Samians in Cydonia (above, p.34): it would have been impossible for 70 Athenian ships to defeat 70 Aeginetan ships, many or all triremes, as they did, unless Athens had many triremes as well. Moreover, 20 of the 70 ships were recent acquisitions, bought from Corinth. At the very least these ships must have been publicly owned rather than private, and, given the Corinthians' fame as pioneer trireme-builders, Athens probably resorted to Corinth specifically in order to buy triremes.[12] Going back further still, the 20 vessels which Athens sent to join the Ionian revolt were surely triremes as well. Herodotus called them 'ships', in his usual manner, but Charon of Lampsacus explicitly said 'triremes', and it is in any case hard to see why a coalition which mustered more than 350 triremes (Hdt. 6.8) would ask for help if Athens could contribute only penteconters.[13]

The Athenian navy, then, did not lag behind the general trend of development in Greece, but consisted of 50 triremes by 500 BC, and 70 by 490. Under Themistocles its size was more than doubled by the building of another 100 triremes, and the last-minute construction of another 30 triremes in 480 brought the total up to 200 at the time of the Persian invasion.

Given the cost of manning triremes, Athens could not have mustered 50 such vessels unless they were publicly funded, as the subsequent acquisitions explicitly were. Athens, then, relied on the private penteconters of the 48 *naukraroi* under Solon and down to at least 530 BC, but possessed a navy of 50 publicly-owned triremes by 500 BC. There are two possible candidates for the crucial moment of change: the reign of Hippias, 527–510 BC, which coincided exactly with the period during which Persian naval expansion stimulated the spread of trireme fleets in Greece, or the reforms of Cleisthenes in 508 BC.

The concentration of power and wealth in the hands of Hippias would certainly have presented a notable opportunity to build triremes. Under monarchical rule, the distinction between public and private funding might become blurred, but the prominence of communal funding even under the rule of kings as portrayed by Homer is striking, and the Peisistratids certainly did not fund all their activities out of private resources (below, p.71). Publicly funded ship-building is thus conceivable, and Herodotus' remark that around 515 BC 'the Peisistratids sent [Miltiades] to the Chersonese in a trireme' (ἀποστέλλουσι τριήρει, Hdt. 6.39) suggests the allocation of a public trireme to Miltiades for use in the public business of governing this Athenian dependency.[14] A story in the Aristotelian *Oeconomica* claims that Hippias funded warfare in part by means of the liturgical trierarchy (1347a12–14), the system used in classical Athens, which implies that publicly-owned warships already existed. This tale has been dismissed as an anachronistic invention, but apart from the general likelihood that Hippias did modernize the fleet, there are also specific grounds for taking the story seriously (below, pp.97–100). The fortification of the harbour Mounychia in 510 may have served to protect new ships as well as the tyrant himself (*Ath. Pol.* 19.2).

On the other hand, Cleisthenes' establishment of 50 new *naukrariai* which were like the later 'symmories' (above, pp.46, 61) is an even better

candidate for the introduction of a public fleet. The abolition of the 48 local Captaincies probably meant dispensing with the use of the Captains' private ships, while the creation of 50 units of tax-payers meant that each new-style Captaincy could pay for a single public trireme. Medieval northern European ship-districts went through a similar development from providing the private ships of local lords to merely paying for the upkeep of ships which were publicly owned and not necessarily even stationed in the district.[15] Themistocles' arrangement for the building of 100 new triremes, as described by *Athenaion Politeia* (22.7), may be an adaption of Cleisthenes' system. In 483, the surplus revenue was assigned to 100 richest men – two per *naukraria*? – who were charged with constructing one trireme each. Under Cleisthenes, the richest man may have collected money from the other tax-payers in each Captaincy and taken charge of the building and upkeep of the trireme. It is important to note that Cleidemus' description of Cleisthenes' new system speaks only of *naukrariai* as groups, not of individual *naukraroi*, and *Athenaion Politeia* speaks only of rich men building ships without suggesting that they also captained them or paid for their crews. This may imply that the new Captaincies served exclusively to pay for the upkeep of triremes, and that some other mechanism – such as the liturgy – was used to recruit actual captains and raise funds to pay for the deployment of the ships.

Perhaps the most plausible interpretation of developments in late sixth-century Athens, then, is that Hippias started building public triremes, while also maintaining the naukraric navy of private penteconters, and that Cleisthenes completed the transformation by merging the two into an all-public, all-trireme navy. One may wonder why such a significant naval reform is so poorly attested, but, as we have noted repeatedly, our sources other than Cleidemus' *Atthis* were reluctant to discuss Athenian naval history before Themistocles. One may also wonder why the Alcmeonid Cleisthenes would change a naval organization from which his family and their 'coastal' supporters, as *naukraroi*, traditionally derived much of their power. However, the need for more and more triremes entailed costs which not even the Alcmeonids could cover from private resources alone, and by instigating naval and political reform Cleisthenes pre-empted the inevitable decline of the power and patronage which his family used to

have as ship-owners, and forged a new powerbase by winning broad popular support instead. The Alcmeonids were subsequently no longer known as the 'coastal' faction.

The threat posed by a new fleet of 50 triremes would help explain why shortly afterwards, from 506 BC onwards, Athens became the target of concerted campaigns by its neighbours and by Sparta,[16] as well as the sudden and staggeringly successful war of conquest against Chalcis with which Athens' responded. Herodotus relates that the Athenians 'made an expedition', saw the Boeotians moving towards the Euripus Straits to help Chalcis, defeated them in battle,[17] then 'on the same day' crossed the straits and comprehensively defeated the Chalcidians as well (5.77.1–2). It is sometimes assumed that the Athenian army in a single day marched all the way across Attica, fought a battle, somehow made the (admittedly short) crossing, and fought another battle, but the story makes much better sense if the expedition involved the entire Athenian fleet sailing up the Euripus, first landing on the west coast to stop the Boeotians from crossing over to help Chalcis, then landing on the east coast to attack Chalcis itself. This famous victory, commemorated with a bronze chariot group on the Acropolis and perhaps with the dedication of a stoa at Delphi as well, was a sign of what the new navy was capable of doing.[18] In response, the destruction of Athens' harbour at Phaleron by Aegina shortly afterwards (Hdt. 5.81) may have been aimed at the new triremes stationed there, and conversely the need to protect this new fleet may have inspired the building of a fortified harbour at Piraeus, begun in 493 BC.[19]

At some point, Athens took one further step towards centralization of naval organization, when the construction and maintenance of triremes was taken out of the hands of the reformed *naukrariai* and made the direct responsibility of the Council, its committee of 'trireme-builders', and the board of 'overseers of the dockyards'. This may have happened in 481/0 when another 30 triremes were built, or more probably in or shortly after 477/6 BC when the Delian League was created and Athens committed itself indefinitely to waging an offensive naval war against Persia, and to building 20 new triremes a year (Diod. 11.43.3). At this point the Captaincies lost their last remaining role and were presumably abolished altogether.[20]

SHIPS' CREWS AND SOLDIERS

Under Solon, the Homeric system of supplying soldiers and oarsmen with provisions for the journey and rewarding them with a share of spoils may well have persisted. At a time before the introduction of coinage, when the Athenian economy was far from fully monetized, it would have been difficult to fund a military expedition in any other way: one could not rely on the crews always being able to acquire their own supplies by barter if one gave them an allowance in silver bullion. Payments in silver bullion were indeed made from the 'fund for the Captains' to sacred envoys, as we have seen, but such payments need not have been made to the crews: a Captain may, for example, have provided food and drink from his own stores and subsequently received reimbursement in silver from the public purse (below, p.90). At a standard daily ration of a *choinix* of barley and a *kotyle* of wine, the crew of a fifty-oared penteconter would consume just over 30 *medimnoi* of barley and 10 *metretai* of wine in a month, less than 10 per cent of the 500 'measures' which were the income qualification for the highest property class, to which the Captains will have belonged.[21]

Classical Athenian practice, by contrast, was to pay crews and soldiers a fixed rate in silver coins, between 3 obols and 1 drachma per day. They would need to spend about 2 obols on provisions; the rest was their reward. Booty was not normally divided up but sold to traders, and the proceeds were used to fund pay. Any surplus was deposited in the public treasury.[22] The adoption of the trireme must have made the introduction of wages for overseas military service almost unavoidable. The increase in manpower made it proportionally harder to supply crews with food and to capture enough booty to reward everyone adequately. At the same time, while predatory campaigns such as the expeditions against Chalcis in 506 and Paros in 489 might, if successful, pay for themselves, 'hegemonic' campaigns for the sake of international status and power, such as the campaigns to impose regime change on Naxos around 540 and Aegina in 491, would almost by definition produce little or no booty to share out in the first place.[23] A new system of supplying and rewarding crews became necessary, and, as a result of increasing monetization, possible: the payment of wages.

The only ancient text to give a date for the introduction of military wages at Athens is a late antique commentary on Demosthenic speeches by Ulpian the Rhetor. Ulpian says that the speaker of *On Organization*, who proposed state pay for everyone capable of military service ([Dem.] 13.4), 'all but models himself on Pericles, for the latter was the first who instituted pay [*misthophora*] and gave it to the people when they went on campaigns' (πρῶτος γὰρ ἐκεῖνος ἔταξε μισθοφορὰν καὶ ἔδωκε τῷ δήμῳ στρατευομένῳ).[24] The verb 'to campaign' (στρατεύω) includes both naval and land warfare, and the claim made here is thus that Pericles instituted pay for all kinds of military service. Earlier sources on Pericles, however, never say that he introduced military pay although they emphasize the importance to his regime of public pay in general, and credit him with the introduction of jury pay in particular. When *Athenaion Politeia* asserts that under Pericles' leadership 'the people got used to drawing pay on campaign' (27.2), the point is that his many military enterprises allowed the people to rely on being able to earn pay for military service regularly, not that Pericles introduced military pay as such (cf. Plut. *Per*. 9). Indeed, *Athenaion Politeia* suggests that already at the time of foundation of the Delian League in 478/7 Aristides envisaged that thanks to the tribute there would be 'maintenance [τροφή] for everyone, for those who went on campaigns, those who served in garrisons, and for those who enacted public business' (24.1). Even then, there is no suggestion that military pay was a new phenomenon, merely that Athens' new position as leader of the League made it possible and necessary to pay many more soldiers and oarsmen. Clearly, Ulpian misconstrued or misremembered what sources like *Athenaion Politeia* said about people 'getting used to' earning military pay and receiving jury pay under Pericles, and his comment does not reliably date the introduction of the wage.

Fourth-century authors took it for granted that already in 480 BC the crews of Athenian ships expected to be paid in silver coin,[25] and this assumption derives support from a campaign of *c.* 470 BC, for which we have the commander's own account as related by his younger contemporary Ion of Chios: Cimon was proud on this occasion to have raised enough money from booty to give his forces four months' wages and still have 'plenty of gold left over for the city'.[26] The point of this story is to show Cimon's guile in getting the more valuable share of the booty

for Athens, without any suggestion that there was something new or unusual about selling booty to raise money for pay, rather than sharing it out among the troops: this system is taken for granted as already well-established. The evidence thus favours the assumption that pay was introduced at Athens well before the Persian Wars, and allows the possibility that wages for overseas service – for oarsmen, sailors, marines, and for troops taken abroad in transport ships[27] – were introduced at about the same time as in neighbouring Eretria, and, I would suggest, no later than 508, when Athens acquired a trireme fleet.

Before that date, wages were already paid by Peisistratus to the foreign troops who helped him seize power in 546 BC. In his earlier coups, Peisistratus had relied mainly on the support of citizens, but during his final exile he made his way 'to the region around Mt Pangaeum from where he took money and hired soldiers' (*Ath. Pol.* 15.2), which must mean that he somehow acquired access to the region's famed gold and silver mines and used his mining revenue to hire Thracian troops. Returning to Greece, he then gathered supporters from Thebes, Naxos and Eretria who 'shared his enthusiasm' (15.2), as well as from Argos which sent 1,000 men out of 'friendship' (17.4; 19.4). Herodotus also stressed the importance of Peisistratus' fund-raising but focused on the 'gifts' collected from Greek cities which 'owed' him, and noted that Lygdamis of Naxos contributed money and troops as a 'volunteer' with the 'greatest enthusiasm'. Herodotus called the Argives 'hired men' (1.61.4), rather than 'friends', however, which may betray a hint of hostility towards the tyrants. Otherwise the picture seems clear-cut: Peisistratus' Greek allies fought on a basis of reciprocity, presumably expecting only food and drink as well as gifts and gratitude in the Homeric manner, but his Thracian troops, without prior ties of friendship or kinship with their employer, served on a contractual basis, for a wage.[28]

The use of hired troops continued after the success of the coup: Peisistratus 'gave his tyranny roots with the aid of many *epikouroi* and revenues of money, some from Athens itself and some coming in from the River Strymon', i.e. from the Mt Pangaeum region (Hdt. 1.64.1). The implication is that Peisistratus kept standing forces, partly funded from private mining income and partly from public revenues raised in Athens. This standing force probably included not only a personal

'guard' (φυλακή) of 'spear-bearers' (δορυφόροι), attested in stories about Hippias, but also the Thracian peltasts and Scythian archers who appear alongside hoplite soldiers in Athenian art from *c.* 540 BC onwards. Herodotus claimed that Miltiades, as tyrant of the Athenian dependency in the Chersonese, 'maintained 500 *epikouroi*' around 515 BC (6.39), and Hippias, as his superior and as ruler of a larger territory, surely kept an even larger force – perhaps as many as 1,000.[29]

It is possible that in 514–510 BC Hippias disarmed the citizen militia altogether and relied wholly on foreign 'allies' in war. The story in *Athenaion Politeia* (15.3–5) that his father Peisistratus had already taken this radical step in 546 BC can hardly be true. It is in direct contradiction to Herodotus' and Thucydides' accounts and contains at least one demonstrable anachronism, but more importantly it is at odds with Peisistratus' evident popularity and with his and his sons' military successes over a span of more than 30 years, which could surely not have been achieved with the aid of foreign 'allies' alone. By contrast, Thucydides' story that Hippias disarmed the citizens in the immediate aftermath of the attempt on his life in 514 (6.58) is credible, both because it offers a clear motive and because it is compatible with the events of 514–510, when Hippias was confined to fighting off a series of attacks on his regime and the only troops mentioned on his side were allied Thessalian cavalry. Strictly speaking, Thucydides says only that Hippias seized the arms and armour of the men in the Panathenaic procession in order to arrest the conspirators, so it is possible that the weapons were returned to the citizens once the immediate threat had passed. But if the confiscation was permanent, then Hippias will from 514 onwards have had to fund very large numbers of non-citizen troops. The increased financial burden would have added injury to the insult of having one's arms and armour taken away, and may have hastened Hippias' downfall.[30]

From 546 BC onwards, wages for military service were thus offered in Athens to foreign 'allied' forces, perhaps especially to Thracian and other non-Greek troops. Outside Athens, the evidence for hiring foreign troops in archaic Greece is limited to Samos and Sicily, as we have seen (p.26). Later stories about Polycrates of Samos and Phalaris of Acragas disarming their citizen militias seem no more reliable than the very similar tale about Peisistratus, and it is not safe to conclude that both

tyrants relied entirely on foreign troops.[31] Greeks had used public and private foreign 'allies' on a reciprocal basis from at least Homer's day onwards, and from the early seventh century Greeks had also served as mercenaries in the armies of non-Greek kingdoms and empires, but so far as we can tell Peisistratus' recruitment of Thracians *c.* 550 BC for his coup and subsequently for his standing 'guard' was the first time that an Athenian, and perhaps any Greek, hired soldiers for a wage.

This innovation would not necessarily entail the payment of military wages to citizen troops as well, since these were of course under a moral obligation to fight for their country and probably under a legal obligation as well. Citizens were surely never paid for emergency general levies of Athenian hoplites and cavalry, joined by light-armed poorer citizens, mobilized to fight defensive campaigns within or just outside Athens' borders. The payment of wages on such occasions would hardly have been expected, necessary, or indeed possible; instead, citizens will have brought their own supplies for a few days and received their reward from plunder, as at Plataea in 479 BC when booty was distributed among all participants according to merit and status, in the Homeric manner.[32] But for smaller forces sent out on longer campaigns, especially overseas, the practice of paying wages to foreign mercenaries will have constituted a precedent which made it easy to conceive of paying citizens wages as an answer to the problems of trireme warfare – especially since triremes made such heavy demands on manpower that their crews may well have included foreign oarsmen, as they did in classical Athens. In this light the introduction of a military wage for citizens in 508 BC seems plausible, and it is even possible that Hippias already paid wages to citizens on campaign – before 514, if we accept the story of their disarmament – as well as to a standing force of perhaps some 1,000 men.

Standing forces may have continued to exist in Athens after the fall of Hippias. In the list of recipients of public pay with which this chapter began, *Athenaion Politeia* includes 1,600 archers, 1,200 cavalry, 500 guards of the dockyards, 50 guards of the Acropolis (24.3) and a number of prison guards.[33] The full number of cavalry and archers was reached only after 446 BC, but the list need not imply that standing forces had not existed or received pay earlier. A survey of the benefits of peace in speeches by Andocides (3.3–7) and Aeschines (2.172–3) claims that at

some point before *c.* 460 Athens established a force of 300 cavalry and 'bought' 300 Scythian archers. As well as being obscure about the date,[34] these texts do not exclude the earlier existence of a smaller cavalry force and tell us nothing about the origins of the regular archers as opposed to the Scythian 'police force' of public slaves. In Herodotus' account of the battle of Plataea 'the archers' make a sudden appearance as if they were well-known by 479 BC, and the Decree of Themistocles assumed that 800 archers were available to join the hoplite marines of the Athenian fleet in 480. Ctesias claimed that Athens employed Cretan bowmen during the Persian Wars, and in the mid-fifth century both citizen and foreign archers were indeed employed. Herodotus' report that the Athenians at Marathon fought without cavalry or archers, apart from being somewhat suspect, need only mean that Athens chose not to deploy such forces, rather than that it did not have any at the time.[35]

Given the limits of the evidence, we must turn to considerations of general probability. Since Athens before Cleisthenes had a cavalry of 100 – two horsemen each from the 48 *naukrariai* plus, probably, one commanding officer from each of the four tribes – it seems likely that a cavalry of at least the same size continued to be raised, ten horsemen from each of the ten new tribes, before their number was increased to 300 in the 460s at the latest. The horsemen were recruited from among the wealthiest citizens, so they may not yet have received public pay or other subsidies, as the much-expanded cavalry did later.[36] If, as we have argued, a public navy of 50 triremes was established by Cleisthenes, Athens would have needed at least 200 archers to serve among the marines, and although it is possible that these were drawn from among volunteers, the hints in our sources at a permanent body of archers in Athens and the parallel of Polycrates' 1,000 citizen archers in Samos (above, p.26), suggest that a standing force of several hundred bowmen was kept, even before the Athenians eventually bought 300 Scythian archers as well. Citizen archers were probably recruited among the less well-off, so that they and their Cretan colleagues were presumably paid a wage.[37]

For the amount of pay we have almost no evidence until the Peloponnesian War. The Athenians at Salamis are said to have received 8 dr each, but this was evidently a lump sum towards subsistence needs, in the manner of 'travel-money', rather than normal pay, and indeed it

was probably meant to fund the evacuation of families as much as naval service.[38] The earliest inscription which may refer to military pay, but is too heavily damaged to restore, mentions a rate of 4 obols. This would fit the story, attested in a much later source, that the fine of 50 talents imposed on Miltiades after the failure of his campaign against Paros was meant to recover public expenditure on the expedition: its cost would indeed have amounted to 50 talents if the wage in 489 BC was 4 obols per day – double the amount of 2 obols regarded as a subsistence income, and just above the lowest rate attested later in the classical period.[39]

At this rate of pay, a standing force of 1,000 men would cost 40 talents p.a., while a trireme crew would cost 4,000 dr per month. The latter figure amounts to a 20-fold increase over the cost of the crew of a fifty-oared penteconter under a system where the captain supplied only food and drink: the requisite 30 *medimnoi* of barley and 10 *metretai* of wine would have cost about 200 dr at classical prices.[40] Keeping a fleet at sea throughout the summer, for three months, would have required less than 5,000 measures of food and drink with a value of 5 talents for the entire Solonian naukraric navy, compared to a cost of 100 talents for a trireme fleet of the same size.

CULT, HOSPITALITY AND OTHER EXPENSES

Thucydides' praised the Peisistratids who, without making excessive financial demands, 'beautifully decorated their city, successfully completed their wars, and sacrificed in the temples' (6.54.5). After warfare, the greatest expenditure was indeed on cult, in the form of regular public sacrifices and festivals, the occasional construction of temples and other cult buildings, and the offering of costly public dedications by way of 'tithes' from the spoils of war and other revenue. Even the greatest religious festivals in early Athens and elsewhere were probably simple outdoor gatherings at which those who attended provided their own feasts and entertainment. Great publicly-funded sacrificial feasts and competitive games and performances were a later development.[41] There are signs of large-scale communal sacrifices already in Homer (above, p.21) and Solon's laws notably regulated the

funding of cult activity, but public spending on cult appears to have accelerated from the mid-sixth century onwards.

One of Solon's lesser-known reforms was the establishment of a ritual calendar, prescribing what public sacrifices were to be made to which gods on which dates – not just in Athens, but across Attica, which confirms the administrative integration of the territory. This calendar is known in some detail because it was reinscribed, with additions, in the late fifth century, and the subject of a legal prosecution in 399 BC.[42] The classical version specified not only which animals were to be sacrificed, but usually also their value in drachmas. That the archaic original did the same is clear from Plutarch's report that the prices for 'select' sacrificial victims listed 'in the sixteenth *axon*' of Solon's laws were much lower than they were in his own day.[43] This measure shows that public interest in cult focused heavily on regulating its cost: the calendar stipulated no details of ritual procedure, only lists of victims and their 'prices' – or rather the sums which the public treasury would allocate to the magistrates or priests in charge of the rite to pay for the sacrifice. Tellingly, the technical term for a 'public sacrifice' was 'a sacrifice at public expense' (δημοτελής).[44] Solon's ritual calendar presumably replaced a system under which individual magistrates and priests decided how generously they would meet their sacrificial obligations, and then tried to recoup as much of the cost as possible from public funds. Establishing fixed limits for expenditure on sacrifices was thus part of the trend towards formalization which is characteristic of the process of state-formation.

Accusations made against the classical revisers of the code give us a rough idea of the scale of spending on sacrifices under Solon. The revisers allegedly added so many new rites to the calendar that there was not enough money to pay for them all, so that even after a sum of 6 talents was spent, '3 talents' worth of sacrificial offerings inscribed on the *kyrbeis* [i.e. in Solon's code] remained unsacrificed' (Lys. 30.20). The total cost of sacrifices by 400 BC was thus 9 talents, of which at least one-third was already prescribed by Solon. Given that in the classical version of the code the average price of a sheep was 15 dr, and of a cow or ox 100 dr,[45] the Solonian calendar ought to have included the equivalent of at least, say, 60 bovines and 800 ovines per year. The total number is substantial, but it would not have been enough to provide a large public feast at any

given festival, and the meat would probably have been consumed by the officiant and a few 'fellow-diners' (*parasitoi*) selected for the occasion (Athen. 234c–5e, 239af). The annual sacrifice of 500 goats to Artemis Agrotera in thanksgiving for the victory at Marathon established in 490 BC may have been the first to provide a public feast for thousands, and certainly represented a great expansion of public spending on sacrifices, perhaps by as much as a third.[46]

The first evidence for public spending on festival entertainment comes with the institution of the Great Panathenaea, *c.* 566 BC, an expanded Panhellenic version of the Panathenaea festival, celebrated every four years with an elaborate programme of competitions and valuable prizes. In the late sixth century, competitive performances of drama at the City Dionysia and dithyrambs at the Thargelia were added, and a number of other, minor festivals is first attested. The Persian Wars inspired a whole series of commemorative cults, including not only the goat-sacrifice to Artemis but also new rites for Boreas, Pan and others, while the discovery of 'the bones of Theseus' on Scyros in 476 BC led to the creation of a new hero-cult.[47] The latter was funded by a special levy, 'the tax of the five drachmas for Theseus', and the dramatic and musical competitions were privately funded, but public expenditure on festivals must nevertheless have grown significantly in the decades around 500 BC.[48]

A final regular cultic expense was the cost of sending public representatives to festivals abroad, which was covered by a Solonian law stipulating that sacred envoys, *theoroi*, to Delphi should receive silver as 'travel money' (*ephodion*) and to cover other expenses (above, pp.41–2). This was evidently not a 'wage', but a lump sum allowance to cover costs alone, which is what such envoys still received in classical Athens. The ordinary crew members of the ships which conveyed envoys were under Solon presumably given only food and drink in the Homeric manner, and later seem to have received only a subsistence allowance of 2 dr rather than the wage paid to those who sailed in military enterprises.[49] Unlike the sacrificial calendar, this law shows no concern with the capping of ritual expenditure, but rather seems designed to encourage envoys to spend lavishly on representing Athens in the international arena, in the knowledge that the public treasury would reimburse the cost.

In addition to these regular expenditures on cult, large sums were spent on the construction of temples and other cult-buildings, which became ever larger, more numerous and more monumental. Later sources quote figures of 200 and 300 talents for mid-sixth-century temples at Acragas and Delphi, respectively. In Athens itself, a major development was the construction of a ramp leading up the Acropolis and a temple of Athena, *c.* 575–550, followed by several more temples and altars from 550 onwards, culminating in the huge temple of Zeus Olympios which turned out to be too large and expensive to complete. Much work was also done at Eleusis, and towards the end of the century at Rhamnous, Brauron, Sounion and Pallene, while still further afield the Athenians built a treasury and stoa at Delphi.[50]

The actual construction work was contracted out to private entrepreneurs who were paid a lump sum in advance and agreed to build to specifications set out in the contract. The evidence for this procedure in the archaic period consists of not entirely reliable later stories, mainly about contractors who allegedly misappropriated the money and used it to pursue their own political ambitions – Phalaris of Acragas, *c.* 570, hired labourers, armed them and seized power; Gorgos of Acragas in 488 hired mercenaries instead of labourers and seized power; the Alcmeonids, *c.* 512, hired mercenaries and tried to expel Hippias from power. But it seems likely enough that this was indeed the sort of arrangement made for both temple-building and for the manufacture of dedicatory monuments from 'tithes' of public revenue.[51]

Expenditure other than on warfare and cult was small for most of the archaic period. Only a few secular public buildings are attested anywhere in archaic Greece: most public business was transacted outdoors or in modest brick buildings. In Athens, the monumentalization of the agora and the creation of an assembly place on the Pnyx around 500 BC seem to have been the start of new developments, but these may have been preceded by construction in the so-called Old Agora, which remains undiscovered. How the new city walls constructed after the Persian sack compared to the older defences – if any – is unknown, but Athens did subsequently spend heavily on extending and developing its fortifications.[52]

Wages, allowances and bonuses made up the rest of the secular, non-military expenditures. In some respects, the most remarkable of

these is the bounty on wolves attributed to Solon: 'he gave five drachmas to anyone who brought in a wolf, and one drachma for a wolf cub, of which sums, says Demetrius of Phaleron [fr. 147 Wehrli], the former was the price of an ox and the latter the price of a sheep' (F 92 R = Plut. *Sol.* 23.3). The trivial sums, which confirm that this is a genuine archaic law, make it easy to overlook the significance of this legislation: the protection of farms and livestock from the threat of wild animals might have remained a matter of purely private concern, yet here is a law which instituted a concerted and publicly-funded campaign to eradicate the wolf from Attica. Not only the evident extension of the public interest beyond the major collective activities of warfare and worship, but also the idea of using financial incentives rather than moral or legal pressure to achieve public goals, is striking testimony to the development of the State and of public finance in Solon's Athens.

More significant in terms of cost, however, were the non-military wages and allowances paid to various groups of citizens. One of the 'sacred' triremes, the Paralos, was in the classical period apparently used mainly to convey diplomatic rather than sacred envoys, and was kept in permanent readiness by paying its all-citizen crew a wage all year round, not just when they were on a mission; a treasurer with the sole function of managing this crew was appointed by election. It seems likely that this standing crew went back at least to the creation of a trireme fleet in the late sixth century. At the reported rate of 4 obols per man per day, it would have cost the sizeable sum of 8 talents per annum.[53]

Aristotle listed three further categories of citizens who 'lived at public expense' in fifth-century Athens: those who dined in the *prytaneion*, orphans and prison guards (*Ath. Pol.* 24.3). Since at least one Solonian law envisaged holding prisoners in temporary custody, prison guards were presumably employed by the city even in the early sixth century, but we know no more about them.[54] Other administrative and executive assistance to magistrates was in the classical period provided by public slaves, including the 300 Scythian archers mentioned above, and at least some public slaves may well have been employed under Solon already. They presumably received only sustenance, not a wage, but the cumulative cost might have been significant.

The right to dine at public expense was at Athens, as elsewhere in archaic Greece (above, p.28), a privilege awarded to high-ranking officials and individuals of special merit. Solon regulated expenditure on the public meals provided in the *prytaneion* – we hear of a rule that wheaten bread was to be served on festival days, barley bread at all other times (F 89 R = Athen. 4.137) – and he defined the right to dine here and in other public places. The entitlement of the Kerykes family to dine at the temple of Apollo Delios 'all year round', for instance, was confirmed by law but also restricted to two members of the family at a time (F 88 R = Athen. 6.234e), while invitations to dine in the *prytaneion* were rationed: 'typical of Solon is also the law about public dining (τὸ περὶ τῆς ἐν δημοσίῳ σιτήσεως), which he called *parasitein* (παρασιτεῖν), for he did not allow the same man to dine often and punished the man who was obliged to dine but refused to do so' (F 87 R = Plut. *Sol.* 24.3). Given that dining rights in the *prytaneion* were often awarded to victorious athletes, it is notable that Solon also fixed public rewards for athletic success: 100 dr for winners at the Isthmia, 500 dr for Olympic champions – the small sums show that this information derives from a genuine early sixth-century law (F 143a R = Plut. *Sol.* 23.3). As in the case of the sacrificial calendar, Solon's legislation here simultaneously limited and formalized public spending, presumably with the aim of removing such expenditures from a sphere of competitive generosity in the Homeric manner.

Larger sums of money are said to have been awarded as one-off bonuses in the early fifth century: 10,000 dr each as a bounty on the head of Artemisia, as a fee paid to Pindar for composing a flattering ode to Athens, and as a lump sum allowance to the son of Aristides in honour of his father's services to the city.[55] The annual wage of 10,000 dr paid to the healer Democedes around 525 BC (above, p.24) confirms that by the late sixth century the city's spending had reached a different order of magnitude from Solon's day, but otherwise stands alone in the Athenian evidence. It is possible that Democedes was a 'court' physician kept at the private expense of the tyrants, but his previous appointment on Aegina shows that he might equally well have been in public service. Late archaic Athens may well have employed other, no doubt less spectacularly well-paid, specialists such seers, teachers and shipwrights.

Aristotle's final category of citizens maintained at public expense, the 'orphans', were more specifically the sons of men who had died in war, granted an allowance until they came of age. One late source says that Solon established this custom (Diog. Laert. 1.55), but this is hardly a reliable attribution, and is hard to reconcile with the fact that Hippodamus of Miletus in the early fifth century felt able to present public maintenance for war orphans as a novel idea (Ar. *Pol.* 1268a8–12). On the other hand, Peisistratus was credited with having introduced a dole for those disabled in war, and Polycrates of Samos with providing for the upkeep of widowed women whose sons died in combat.[56] These attributions are unusual enough to suggest that there was some evidence for them, and, whatever the precise chronology, we may conclude that a range of forms of financial support for the victims of war was established in the late sixth and early fifth century, at a time when warfare became more frequent and perhaps involved increasing numbers of less wealthy citizens. A dole of 1 obol a day for all invalids without income from work and property worth less than 300 dr, again unreliably attributed to Solon, may in fact also have been established at about this time. The cumulative cost of such expenditures was not negligible: at the minimal rate of 1 obol a day, the upkeep of 100 men cost 1 talent p.a. – and the population of archaic Attica must have included many hundreds of invalids, disabled veterans and war orphans. The public funeral for casualties of war which was instituted at Athens in the 460s at the latest was thus not only an expression of new egalitarian political ideals but also part of a recent trend in public spending towards covering both military wages and a growing range of 'collateral' costs of war.[57]

5 Taxes, Tolls and Tribute: Public Revenue

By the late sixth century the public spending of many Greek cities had reached a level at which the levying of a wide range of taxes had become necessary and commonplace (above, pp.28–9). But Greek states did not develop the modern concept of tax-paying as a routine obligation of all citizens, and probably never levied the annual direct property-, income- or poll-taxes with which we are familiar. Cities with a large income from import and export duties, harbour tolls and market fees, like Corinth, or with revenues from mines, like Thasos, might forgo direct taxation of its citizens altogether, rather than increase public spending power by raising taxes as well.[1]

An ideology hostile to direct taxation, however, was inevitably balanced at least on occasion by an urgent need for public funds which could only be raised by taxing citizens. The classical Athenian solutions are well known: an *ad hoc* 'contribution' (*eisphora*) was levied, but only in emergencies and only on a quite small proportion of the population, while part of the regular financial burden was devolved onto very wealthy individuals who covered these expenses as a personal 'liturgy' (*leitourgia*), literally 'service'. Scholars often argue or assume that these forms of taxation were peculiarly classical Athenian inventions. We will argue, however, that irregular *eisphora* levies on the wealthier citizens were the normal form of direct taxation in Greece, and were more commonly and widely applied in archaic than in mid- or late fifth-century Athens – as one would expect at a time before the city acquired the great revenues from silver mining, allied tribute, and levies on trade which for most of the fifth century enabled it to manage with very little direct taxation.[2] The *eisphora*

existed from Solon onwards and was reformed under Cleisthenes, while the liturgy first appeared in the late sixth century in response to rising public spending.

THE 'CONTRIBUTION' (*EISPHORA*) UNDER SOLON AND THE TYRANTS

In Plato's ideal city, the authorities had a choice between two kinds of *eisphora*: one was a proportion of the value of a citizen's property; the other was a proportion of his 'income in any given year' (τῆς γενομένης ἐπ᾽ ἐνιαυτὸν ἑκάστοτε προσόδου) in the form of the produce from his landed estate (*Laws* 955de). The second type of *eisphora* is here conceived of as an income tax, but such a levy on agricultural produce is the only common exception to the rule that income taxes were not raised in the ancient world, and significantly it involved a form of income derived from the ownership of land. Both kinds of *eisphora* thus were in essence taxes on property, whether on farm land alone or on property of all kinds.[3] Both forms are well-attested in Athens: the tyrants levied a tax on agricultural income, while from 378/7 BC onwards taxes were levied on the total value of property. What forms, if any, the *eisphora* took before Peisistratus and after Hippias is not directly attested, but can be reconstructed.

Thucydides praised Hippias for ruling with moderation and success while levying 'only a twentieth on produce' (εἰκοστὴν μόνον […] τῶν γιγνομένων, 6.54.5). *Athenaion Politeia* argued that Peisistratus was concerned to keep his subjects hard at work on their farms, which had the incidental benefit of increasing his own revenues 'for he levied a tithe on produce' (ἀπὸ τῶν γιγνομένων δεκάτην, 16.4; cf. 16.6). Since Hippias' expenditures were, if anything, greater than those of his father, it is unlikely that he could afford to lower taxes, so Aristotle probably used 'tithe' in the generic sense of 'levy' rather than literally 'a tenth', and the tax actually levied was 5 per cent throughout.[4] It has often been assumed that a tax on wealth was first introduced by Peisistratus, that it was annual, and that it applied to all landed property.[5] Aristotle superficially gives this impression but does not actually say so. Such a

permanent and pervasive tax without precedent and without parallel in later Athenian history would hardly have won the tyrants a reputation for their moderation in demanding 'only' 5 per cent. More probably, Aristotle and Thucydides envisaged the 'tithe' as a predecessor of the classical *eisphora*, i.e. a tax levied only when the need arose and only from the estates of the wealthy,[6] and as the successor of a similar older levy.[7]

Indeed, Aristotle had told us earlier that *eisphorai* were prominent among the levies collected by the Captains which were often mentioned in Solon's laws (above, pp.44–5). These Solonian *eisphorai*, too, will surely have taken the form of occasional taxes on agricultural produce, which were thus the norm in Athens from at least 594 to 510 BC, as they were elsewhere in archaic Greece.[8] A relative scarcity of other revenue may have meant that *eisphorai* were raised more often in the sixth than in the fifth century, especially often under the ambitious tyrants – perhaps almost every year, without quite becoming a regular tax. Solon's and the tyrants' *eisphorai* were probably paid by a larger proportion of citizens than in the fourth century, when no more than 1,200 or 2,000 of the wealthiest men, about 5 per cent of the citizen population, contributed to it.[9] In the sixth century, the proportion may have been as high as 15 per cent, if, as seems likely, liability for *eisphora* taxes was determined by the Solonian system of property classes.

Scholars have tended to be cautious on this subject,[10] but there is much to be said in favour of the property classes serving fiscal purposes, even aside from the obvious observation that historically a very common purpose of assessing property or income has been to tax it. One general consideration is that in early Athens the evaluation of wealth must have been largely a matter of self-assessment – subject to some social control, no doubt – and self-assessment can only work if the privileges of belonging to a certain class are balanced by onerous obligations, among which paying taxes is likely to feature. The link was made explicit in oligarchic propaganda of 411 BC, which proposed that political privileges in Athens should be confined to those who served 'with their possessions and their persons', i.e. contributed to *eisphorai* and liturgies and served in the army (Thuc. 8.65.3; *Ath. Pol.* 29.5). 'Belonging to a property class' and 'paying taxes' were indeed so closely

associated in Greek that the same verb, τελέω, was used for both; τέλος means both 'tax' and 'property class'.[11] Accordingly, Plato envisaged for his ideal city a system of four property classes – the same number as in Athens – for 'office-holding, *eisphorai* and distributions' (*Laws* 744bc). Decisively, the Solonian property classes were defined in terms of annual income from farming, and it is surely absurd to suppose that *eisphorai* on agricultural income would be levied without reference to a system which recorded how much agricultural income citizens had. Indeed, it seems likely that a classification system based on the size of one's annual harvest was adopted with the levying of *eisphorai* prominently in mind.

This conclusion is open to a few objections, but none of these are compelling. One could argue that Athens under Solon had neither the need nor the means to levy taxes, so that the property classes could not have served that purpose,[12] but any such notion should have been sufficiently dispelled by our discussion of financial administration and public expenditure so far. Secondly, one might object that the accounts of the Solonian property classes by Aristotle (*Ath. Pol.* 7.3–4) and Plutarch (*Sol.* 18.1–2) mention no fiscal functions, while the account in Pollux's *Lexicon* (8.130), which does credit them with tax obligations, does not describe the kind of levy associated with Solon and the tyrants. We will return to Pollux (pp.92–6), and for the moment merely note that a little later he confirms the fiscal role of one of the property classes: he says that 'the *zeugêsion* was a tax paid by those who kept a span of oxen' (ζευγοτροφοῦντες, 8.132), by which he must mean the *zeugitai*, (rightly) understood as named after their ownership of a yoke of plough-oxen.[13] The absence of any mention of taxation in the other two authors is easily explained. Both are concerned with the political privileges which Solon assigned to property classes, not with their obligations. Both omitted the duty of the highest three classes to serve in the army, which is attested elsewhere,[14] so it is entirely possible that they also omitted the duty to pay tax. Moreover, the Aristotelian account claimed that the property classes already existed before Solon (*Ath. Pol.* 7.3), and thus described only their new political dimension, not their older functions – such as, perhaps, levying troops and taxes.[15]

A final possible objection is that the definition of classes by agricultural income which our sources report is not authentic. Aristotle, Plutarch and Pollux all say that the highest class were the straightforwardly-named *pentakosiomedimnoi*, who had an annual income of 500 'measures, dry and liquid combined'. These were followed by the *hippeis* ('horsemen') with an income of 300 measures, then the *zeugitai* ('yoke-men') with 200 measures, and finally the *thetes* ('hired labourers') with less.[16] There was, however, debate about whether the *hippeis*, as 'some' argued, were or were not originally defined by owning a horse instead of, or as well as, having an income of 300 measures (*Ath. Pol.* 7.4). This element of uncertainty suggests that property qualifications were not explicitly prescribed in Solon's laws, which in turn means that the qualifications as reported could conceivably be scholarly invention or reflect a later system, projected back onto Solon. What is more, the lowest property threshold was set at a remarkably high level: a *zeugites*' farm producing 200 measures was clearly not much smaller than the 300-measure estate of a *hippeus*, who belonged to the Athenian upper class. A 200-measure farm could easily sustain 15 people rather than just a single family; its size, extrapolated from the size of the harvest, would have had to be at least 16 ha (40 acres), enough to enable the owner to live a life of leisure while slaves and hired men cultivated his estate. Only those who reached this threshold were liable to military service, yet they could hardly have been numerous enough to constitute the whole of the fifth-century Athenian hoplite militia.[17]

It has therefore been suggested that originally, under Solon, the property qualifications were not expressed in measures of annual produce but were left vague and informal: the *hippeis*, *zeugitai* and *thetes* represented either a rough economic hierarchy – owners of horses, owners of oxen, labourers – or else a military hierarchy of cavalry, hoplites and those who could not afford to serve. On this view, the precise quantification of these statuses was either an ancient scholarly construct or a later historical development, introduced at a time when it had become possible and desirable to set the lowest property threshold higher than it was under Solon.[18]

But such theories fall down on the existence of the highest class, the *pentakosiomedimnoi*, explicitly attested by a Solonian law (*Ath.Pol.* 8.1;

47.1): their very name shows that they were from the outset defined by a precisely quantified amount of agricultural income. Even if this highest class was newly created by Solon, while the lower three already existed before his reforms, as has often been suggested, it is unlikely that he would have defined his new elite by a precise income threshold yet left membership of the second and third classes vague and informal.[19] Precise quantification was, in general, a feature of Solon's laws, as we saw in the case of the ritual calendar and other forms of expenditure (above, pp.76–80) and as is even more strikingly illustrated by the minutely prescribed distances from neighbouring estates to be observed in planting trees, keeping beehives and using wells.[20] In the same spirit, Solon would surely have introduced precise property thresholds for all the classes rather than for the *pentakosiomedimnoi* alone – as indeed Aristotle cogently argued against those who thought that Solon might have defined the class of *hippeis* simply by the criterion of horse ownership (*Ath. Pol*. 7.4).

The figures of 500, 300 and 200 measures which our sources cite, although evidently not directly attested in Solonian law, were thus not scholarly inventions. They must represent the income thresholds of the property classes as they existed in the classical period. In the case of the *pentakosiomedimnoi*, whose production of 500 *medimnoi* of grain was written into their name, it is clear that their income threshold under Solon was in fact virtually identical to their classical successors' 500 dry and liquid measures. This makes it likely that the economic level of the *hippeis* and *zeugitai* was also essentially the same in the archaic as in the classical age, with property thresholds of 300 and 200 *medimnoi*. Moreover, given how high the 200-*medimnos* threshold was, it seems inconceivable that it could have been higher still under Solon, and it is equally hard to imagine that it might have been lower originally but raised at some later stage – which would have deprived poorer citizens of political rights at a time when Athens was otherwise moving towards greater political equality.[21]

In short, we must accept that our classical sources give us an accurate picture of Solon's system of property classes, and we must look for some other solution to the problem that the threshold for the *zeugitai* was too high to correspond to the minimum agricultural income of the classical

hoplite militiaman. A simple solution would be to conclude that military duties were not connected to the property classes, after all, but this is contradicted by the admittedly very limited evidence, and seems unlikely on general grounds as well.[22] I would argue instead that the property classes did have a military function until the fourth century, and that the legal obligation to serve as a hoplite was indeed confined to a small, wealthy section of the citizen body. Under Solon, there will have been few outside this group who could afford to fight as hoplites. By the fifth century, however, many small farmers and others below the economic level of the *zeugitai* could and did fight as hoplites, but these *thetes* were never under a legal obligation to so, and did not enjoy the attendant office-holding rights. Such less wealthy hoplites turned up for general levies, and might volunteer to serve for pay on overseas expeditions as regular hoplites or as marines on warships.[23] For our present purposes, it matters little which of these views one adopts. Both are compatible with the Solonian property classes having been defined by agricultural income, as reported by our sources, and designed chiefly to serve a fiscal purpose.

If an *eisphora* of one-twentieth was levied, a *zeugites* thus contributed 10 measures of produce, a *hippeus* 15 measures and a *pentakosiomedimnos* 25. The payments are unlikely to have been made in barley alone, but also in other commodities – one remembers the public levy in grain, wine and livestock mentioned by Homer (above, p.19) – and in silver, given that the 'fund for the Captains' contained silver, presumably alongside stored produce.[24] A special levy paid partly in grain and partly in silver is indeed attested at Athens (below, p.98). A rate of conversion between grain, other commodities, and silver would thus have been required, and this is precisely what we find in a Solonian law: 'for in the valuations of sacrifices he reckons a sheep and a drachma as equivalent to a *medimnos*' (εἰς μέν γε τὰ τιμήματα τῶν θυσιῶν λογίζεται πρόβατον καὶ δραχμὴν ἀντὶ μεδίμνου, Plut. *Sol*. 23.3). Whether this rate featured in a law on 'sacrifices' (θυσία) or, as an attractive and widely adopted emendation has it, on 'properties' (οὐσία),[25] we may assume that it was generally valid under Solon, and was applied also in the assessment of income and taxes.

The highest property class was thus named *pentakosiomedimnoi* not because only income in *medimnoi*, 'dry' measures of grain, counted, but

because the *medimnos* of barley was a general standard of measurement.[26] Although the vast majority of income would no doubt have consisted of produce, it was evidently possible to include increases in livestock and revenues from loans of silver as well.[27] Accordingly, one could meet one's *eisphora* obligations in a variety of ways: a *zeugites* might contribute, say, a drachma of uncoined silver, three sheep and six measures of barley. The high valuation of silver and low valuation of animals presumably reflected a scarcity of silver and relative abundance of livestock in the early sixth century,[28] and would have encouraged the payment of tax in silver rather than in kind towards the end of the century, when silver supplies increased dramatically (below, pp.92–5).

The practicalities of collecting, storing and distributing a tax in kind are worth noting. Since it was the *naukraroi* in their local districts who collected the tax, and since most of it was spent on the naval forces mobilized by these same Captains, a simple and efficient system might have been to store and distribute the tax locally. However, the existence of a central fund 'for the *naukraroi*' managed by the Ham-Collectors makes little sense if most of their expenses were met locally, so we must assume that the Captains in fact handed over the collected grain to the public treasurers, who then distributed funds as necessary.[29]

This ferrying back and forth of agricultural produce may seem clumsy, but it would have allowed much greater central control over revenue. The Ham-Collectors and other central authorities would have been able to decide what part of the levy to earmark for the Captains' fund, and what other sources of revenue, 'national' rather than local, to assign to this fund. The central authorities may also have had to decide in what proportions to allocate grain, wine, animals and silver, and perhaps how much of the tax in kind to sell for silver bullion or, later, coin. Central storage would have required a sizeable space, but not necessarily a distinct building like a medieval tithe-house – when a tax in grain was raised during the fourth century, tens of thousands of *medimnoi* were temporarily stored in a sanctuary at a corner of the agora.[30] The main disadvantage of central storage would have been the extra time needed to get resources to the Captains, but in an emergency the Captains presumably provided supplies from their private stores and were later reimbursed from public funds, in the Homeric manner (above, pp.18–19). We can only speculate

about the details, but the existence of a central fund from which the bulk of expenses were paid shows that simple practical convenience counted for less than central control over finance.

In whatever form they were paid, the 10 *medimnoi* which were a *zeugites*' contribution to a 5 per cent *eisphora* amounted to the equivalent of a year's grain and wine rations for an adult male. The higher classes accordingly contributed the equivalent of 1.5 and 2.5 annual rations.[31] If each class had the same number of members, the average tax-payer would have provided maintenance for 1.7 men; if the proportion of *zeugitai* was far larger the number might have fallen towards 1.1. How much the tax raised in total depends, of course, on the size of the citizen population and the proportion of *eisphora*-payers. The number of adult male citizens may have been about 20,000 under Solon and grown to 30,000 by the end of the sixth century. Those who equate *zeugitai* with hoplites have generally estimated the top three property classes as encompassing a third to half of all citizens, which would mean that a 5 per cent tax raised enough to feed some 10,000–15,000 men.[32] However, since we have seen that the property threshold for *zeugitai* was in fact much higher than for hoplites, the top three classes could not have amounted to more than about 15 per cent of the citizen population, and on that basis the tax would have raised enough only to feed 4,500–6,500 men.[33] Even at the lower end of the range, this would have been enough to supply a fleet of 48 fifty-oared penteconters with food and drink for two years – in other words, much more than Solonian Athens was likely to spend even in time of war. We should probably infer that the Solonian rate was lower than the rate under Hippias, for instance one-fiftieth rather than one-twentieth. With the introduction of standing forces and military wages, and extensive public building, under Peisistratus and Hippias, however, even a 5 per cent tax would quickly have started to fall short.

THE *EISPHORA* AFTER CLEISTHENES

It is commonly assumed that direct taxation stopped after the expulsion of Hippias, and this assumption is at first sight supported by Thucydides' report that in 428/7 BC the Athenians 'for the first time raised an

eisphora of 200 talents' (3.19.1). If such direct taxation had been an innovation of the tyrants and had been spent on ambitious projects which the Athenians subsequently abandoned, it would indeed surely have been among the first things to go, along with their regime. But since the *eisphora* went back to Solon and was at worst merely raised at a higher rate and frequency under the tyrants, and since public spending cannot have fallen back to Solonian levels, given the creation of a public trireme fleet in 508 (above, pp.66–8), it is much more likely that this form of taxation continued to exist. Hence we have every reason to believe Aristotle when he implied that the collection of *eisphora* continued, as one of the tasks which Cleisthenes transferred from the Captains to the demarchs.[34]

Moreover, we have some epigraphic evidence for the existence of *eisphora* after 510 and before 428 BC. The oldest surviving Athenian public decree stipulates that settlers on Salamis 'must pay tax and perform military service' (τελεῖν καὶ στρατ[εύεσθ]αι); the various possible restorations of the damaged context all imply that this was the norm for Athenian citizens.[35] Although the decree cannot be dated on epigraphic grounds more precisely than *c.* 500 BC, it is generally agreed to postdate the fall of Hippias, and by far the most likely political context for it is the regulation of the status of residents of Salamis as part of, or shortly after, the reforms of Cleisthenes which put Athenian citizen status on a new footing. The Salaminian settlers and the Athenians evidently paid this tax by virtue of their legal status, not as a levy on particular transactions or activities, and no known tax other than the *eisphora* fits the bill. The association with military service, another obligation of the property classes, confirms this. At the other end of the chronological range, inscriptions also attest *eisphora* levies well before 428. Thucydides' comment must therefore mean, not that this year saw the first *eisphora* ever, but the first *eisphora* of 200 talents – by far the largest sum attested.[36]

So we may infer that the institution of the *eisphora* continued to exist, and we may surmise that after Cleisthenes it saw some changes, apart from its transfer from the care of the Captains to the duties of the demarchs: the rapid monetization of Athens in the late sixth century must have encouraged a move towards taxation in coin rather than in kind. In this context, we may be able to place a passage in Pollux

which connects the property classes with the payment of taxes but in a way that does not fit either the situation reconstructed for Solon and the tyrants above, or the new system created in 378/7. Pollux's information is, moreover, difficult to understand, so that it has rarely been taken seriously.[37]

> There were four property classes of *pentakosiomedimnoi*, *hippeis*, *zeugitai* and *thetes*. The first were named after the fact that they produced 500 dry and liquid measures, and they paid a talent into the public treasury. Those who were of the *hippad* class seem to have named after the fact that they were able to keep horses, and they produced 300 measures, and paid half a talent. Those who were of the *zeugêsion* class were reckoned from 200 measures, and they paid 10 minae. Those who were of the thetic class held no office and paid nothing at all.
>
> τιμήματα δ' ἦν τέτταρα, πεντακοσιομεδίμνων ἱππέων ζευγιτῶν θητῶν. οἱ μὲν ἐκ τοῦ πεντακόσια μέτρα ξηρὰ καὶ ὑγρὰ ποιεῖν κληθέντες· ἀνήλισκον δ' εἰς τὸ δημόσιον τάλαντον· οἱ δὲ τὴν ἱππάδα τελοῦντες ἐκ μὲν τοῦ δύνασθαι τρέφειν ἵππους κεκλῆσθαι δοκοῦσιν, ἐποίουν δὲ μέτρα τριακόσια, ἀνήλισκον δὲ ἡμιτάλαντον· οἱ δὲ τὸ ζευγήσιον τελοῦντες ἀπὸ διακοσίων μέτρων κατελέγοντο, ἀνήλισκον δὲ μνᾶς δέκα· οἱ δὲ τὸ θητικὸν οὐδεμίαν ἀρχὴν ἦρχον, οὐδὲ ἀνήλισκον οὐδέν. (8.130)[38]

Pollux thus attests to a total payment into the public treasury of 10,000 dr to which the *pentakosiomedimnoi* contributed 6,000, the *hippeis* 3,000 and the *zeugitai* 1,000.

Not only are the amounts given in silver rather than agricultural produce, but they cannot even represent a monetized version of Solon's *eisphora* or the tyrants' 'tithe' because the proportions of the tax (6:3:1) do not correspond to the proportions between the property class qualifications (5:3:2).[39] If this system existed at all, it would therefore have had to be a later creation, dating to Cleisthenes at the earliest. The sums given are far too low to represent the amount of paid by all tax-payers collectively – 10,000 dr would cover only a day and a half's wages for a fleet of 50 triremes, at a rate of 4 obols – and far too high to represent the amount paid by each tax-payer individually. A theoretical possibility is that Pollux cited the sums paid per tax-paying unit, but no such units other than the demes are known to have existed between 508 and 378, when tax-paying symmories were created, and the demes

were far too unequal in size to have each contributed the same amount.[40] Another solution, proposed by Boeckh, is that Pollux's figures were not sums of money paid but amounts of property on which taxes were levied, i.e. this scheme used a concept of 'taxable property' (*Steuerkapital*) which might be only a fraction of one's real property, and introduced the principle of 'progressive' taxation insofar as the higher classes were taxed on a larger proportion of their property than the lower classes. But this involves departing quite far from the text as well as from any other known ancient practice, and has rightly been rejected by everyone from Beloch onwards.[41]

This leaves only one further logical possibility, which arises if this version of the *eisphora* was not a percentage tax on income or property but a fixed sum to which the tax-payers contributed. This does seem to be what Thucydides implied when he said that an *eisphora* 'of 200 talents', rather than e.g. 'a fiftieth' or 'a hundredth', was levied (3.19.1). A system which was based on collecting a fixed sum would have needed rules about what proportion of the target amount of tax each tax-payer or each property class was required to contribute, and this may be what Pollux is describing. The total sum of 10,000 dr may seem a nice round figure but is actually rather odd for a tax-levy calculated in talents and therefore in multiples of 6,000 dr. It has been plausibly suggested that the 'one-sixth' tax owed by *metoikoi* meant that these resident aliens paid a sixth of the *eisphora* – which again works best if the tax raised a fixed sum rather than a percentage – and we should thus add 2,000 dr to the citizen-payments listed by Pollux to reach a total of 2 talents.[42] This sum may then have been the notional minimum for an *eisphora* levy, which would in practice have consisted of multiples of two talents – including the 100 x 2 talents raised in 428/7 BC.

A further calculation, not mentioned by Pollux, would have been needed to convert the sums owed by classes into sums which the demarch had to extract from the members of each class in his deme, as recorded in the deme's register of citizens, the *lexiarchikon grammateion*. If copies of these registers were available centrally, it would have been a simple matter to calculate how much *eisphora* any individual owed by dividing the sum required from each class by the number of tax-payers registered in that class. The resulting sums would often have

been odd and small, but the demarch could presumably have resorted to rounding off and other arrangements in order to raise the correct overall sums.[43]

Alternatively, if no central records were available, shares of the *eisphora* would have had to be assigned to demes in proportion to their size, and it might have been left to the demarch to raise sums in the requisite proportions from the property classes in his deme. A ready-made formula for such a hypothetical *eisphora*-allocation to demes was available in the form of the so-called bouleutic quota, which determined how many of the 500 positions on the Council each deme was entitled to fill. A quota of one Councillor in 500 would correspond to a quota of 20 dr in every 10,000 dr *eisphora* levied. Since the very smallest demes sent only 0.5 Councillor – one every other year – their tax quota would have been 10 dr per 10,000, i.e. 6, 3 and 1 dr for the resident *pentakosiomedimnoi*, *hippeis* and *zeugitai*, respectively.[44] The largest deme, Acharnae, with 22 Councillors, would have owed 440 dr per 10,000, i.e. 264, 132 and 44 dr for the respective property classes. When an *eisphora* was announced, a demarch would thus have known instantly what multiples of their tax-quota each property class within his deme was required to pay, and it would have been left up to him to ensure that the tax-payers in the deme between them contributed the correct amounts.[45]

The above is of course entirely speculative, but given the undoubted existence of both deme registers and bouleutic quotas from Cleisthenes onwards, neither of these schemes would have been too complex for the Athenians to conceive or administer. Something like the system of taxation described by Pollux was therefore feasible in Cleisthenes' time, and may have been the form of *eisphora* which after 508 replaced the earlier levies. Since it was based on property classes defined by agricultural income, Pollux's *eisphora* was in essence still a 'tax on crops', like the Solonian and Peisistratid versions, but the changes are striking. First, it was paid entirely in silver, rather than in kind. The transition need not have been abrupt, however, since the favourable conversion rate set by Solon probably encouraged the paying of taxes in silver already (above, p.90). Secondly, the 'Cleisthenic' *eisphora* was a more flexible and precise instrument of taxation, insofar as it

could be used to raise any multiple of 2 talents, whereas Hippias' one-twentieth would always raise roughly the same amount regardless of specific need.

Thirdly and most importantly, the new system redistributed the tax burden so that a larger proportion was carried by the very richest, and in doing so took a crucial step from the archaic *eisphora*, paid by 15 per cent of citizens, to the fourth-century *eisphora,* paid by only about 5 per cent. That at least 15 per cent of citizens still paid *eisphora* even in the late fifth century is shown by the claim of the oligarchs in 411 that 5,000 men did most for the city, not only 'with their bodies' but also 'with their money', i.e. through *eisphorai* and liturgies.[46] But under Pollux's scheme, most of these 5,000 would have contributed only very small amounts. Whereas an archaic tithe on the agricultural income of the property classes made a *pentakosiomedimnos* pay only 2.5 times as much as a *zeugites*, the new scheme made the highest property class in effect pay half of the *eisphora*, the *hippeis* a quarter, the metics a sixth, and the *zeugitai* a mere twelfth. Since there were surely fewer tax-payers in the higher property classes, the ratio at which individual *pentakosiomedimnoi* paid was very high indeed: if there were, say, 3 *zeugitai* for every *pentakosiomedimnos*, each of the latter would have paid 18 times as much as each of the former.[47] This shift in the tax burden towards the two highest classes may explain why these were exempted from an emergency mobilization in 427 BC (Thuc. 3.16.1): they did their patriotic duty instead by contributing 150 talents to the record-breaking 200-talent *eisphora* of that year, while the *zeugitai* paid only about 17 talents. It is a strong reason to accept the accuracy of Pollux's information that in implying the marginalization of the *zeugitai* as tax-payers it offers a plausible scenario for how Athens gradually moved towards complete exemption of *zeugitai* from *eisphora* obligations in the fourth century.

The date at which Pollux's scheme was introduced and the date at which it was abolished must remain uncertain, but once again Cleisthenes' reforms mark a moment at which some such innovation was required, and nothing in the system would not have been viable at this time. The system may have continued to function until the tax reforms of 378/7, or of course it may have been replaced by a different scheme earlier, for example in or after 428/7 BC. If Pollux's version of

the *eisphora* was indeed created by Cleisthenes, the great reduction in the tax-burden of the *zeugitai* will have been a factor in making his reforms popular.

HIPPIAS' LEVIES AND LITURGIES

An increase in public spending under Peisistratus and Hippias leads us to look for attempts to create additional revenue, especially since they were praised for keeping the *eisphora* low. This is precisely what we find in an interesting little dossier of Hippias' fund-raising stratagems in the Aristotelian *Oeconomica* (1347a), where significantly Hippias is one of only four archaic examples to have been deemed worth inclusion among the mostly fourth-century material, and the only archaic figure with more than one stratagem to his name.[48] Classical anecdotes about tyrants are often unreliable, and the greed of classical tyrants is a common subject of complaint, so that scholars have found it easy to ignore this evidence.[49] But it is remarkable that, apart from the material assembled in *Oeconomica*, there is almost no tradition about unusual fund-raising by *archaic* tyrants, or even about their greed in general. What is more, the Aristotelian author has no anti-tyrannical or other moralizing agenda in relating his stories, which he presents because they seem to him 'by no means without usefulness' and suitable for imitation by others (1346a26–9). The measures attributed to Hippias are thus unlikely to be the product of mere hostile fantasy.

> (1) Hippias the Athenian sold the parts of upper floors which projected above public streets and stairways and fences and doors which opened outwards: those who owned the properties bought these and in this way he collected a large amount of money.
>
> Ἱππίας [ὁ] Ἀθηναῖος τὰ ὑπερέχοντα τῶν ὑπερῴων εἰς τὰς δημοσίας ὁδοὺς καὶ τοὺς ἀναβαθμοὺς καὶ τὰ προφράγματα καὶ τὰς θύρας τὰς ἀνοιγομένας ἔξω ἐπώλησεν: ὠνοῦντο οὖν ὧν ἦν τὰ κτήματα, καὶ συνελέγη χρήματα οὕτω συχνά.
>
> (2) He rendered existing Athenian currency invalid, and after fixing a price he ordered it to be brought to him; after it had been collected for the purposes of striking it with a new design, he handed out the same silver.

τό τε νόμισμα τὸ ὂν Ἀθηναίοις ἀδόκιμον ἐποίησε, τάξας δὲ τιμὴν ἐκέλευσε πρὸς αὐτὸν ἀνακομίζειν: συνελθόντων δὲ ἐπὶ τῷ κόψαι ἕτερον χαρακτῆρα, ἐξέδωκε τὸ αὐτὸ ἀργύριον.

(3) Regarding those who were about to act as trierarch, phylarch, *choregos* or to spend on another such liturgy, he fixed a moderate sum and decreed that he who wished to pay this should be entered on the list of those who had completed their liturgies.

ὅσοι τε τριηραρχεῖν ἢ φυλαρχεῖν ἢ χορηγεῖν ἤ τινα εἰς ἑτέραν λειτουργίαν τοιαύτην ἤμελλον δαπανᾶν, τίμημα τάξας μέτριον ἐκέλευσε τὸν βουλόμενον ἀποτίσαντα τοῦτο ἐγγράφεσθαι εἰς τοὺς λελειτουργηκότας.

(4) One had to pay a *choinix* of barley, another of wheat, and an obol to the priestess of Athena on the Acropolis on behalf of anyone who died, and the same was due from everyone to whom a baby was born.

τῇ τε ἱερείᾳ τῇ τῆς Ἀθηνᾶς τῆς ἐν ἀκροπόλει ὑπὲρ τοῦ ἀποθανόντος φέρειν χοίνικα κριθῶν καὶ πυρῶν ἑτέραν καὶ ὀβολόν, καὶ ὅτῳ ἂν παιδάριον γένηται, τὸ αὐτὸ τοῦτο.

The first story comes closest to seeming a devious ploy, but as noted the author regards it as a viable scheme. The stratagem rests on a conception that anything found in public space is public property, and it amounts to charging for the use of public space. This principle would not in itself have struck a fourth-century Greek as unusual or illegitimate – only the lengths to which Hippias went in applying the principle make his case stand out. In support of the historicity of the anecdote, we may note that a new formal demarcation of public space is archaeologically attested in late sixth-century Athens, and the Peisistratids are credited with an active role in formally marking the road network of Attica.[50]

The second story presumably means that Hippias raised money by charging a fee for compulsory re-minting. Several changes of coin design can indeed be dated to Hippias' reign, and we shall suggest below that the anecdote probably refers to the introduction of a new coin type, the famous 'Owl' (Ch. 6, pp.125–6).

Skipping to the fourth item, which is not explicitly attributed to Hippias and may in fact have been an even older Athenian practice, we find another perfectly plausible and unobjectionable measure, even if it is implied that this form of levy was uncommon. It is of interest mainly

because it refers to form of payment which may have been common in the archaic age: partly in silver, partly in kind.

In this context of fund-raising methods which have at the very least a historical core, then, we should take seriously also the third and most interesting story, that Hippias allowed citizens to fulfil a 'liturgical' obligation simply by paying money. The comment that he only demanded a 'moderate' sum shows once again that this is not hostile propaganda. From our point of view, the commuting of the obligation is less interesting than the claim that in Hippias' day liturgies, and particularly the trierarchy, existed in the first place. This has been routinely rejected as a simple anachronism, but it has recently been argued that the introduction of the *choregia*, the task of 'producing' and financially sponsoring a musical or dramatic ritual performance may very well have occurred under Hippias.[51] Moreover, there was no such thing as a liturgical *phylarchia* in the classical period, so that the reference to this liturgy cannot be the result of careless anachronistic assumptions. Either the phylarchy is a wild fiction, or, more likely, it was an archaic liturgy which no longer existed in the classical period. The *Oeconomica* may thus reproduce genuine archaic information. Since in classical Athens *phylarchia* was an elected military office, the command over a tribal squadron of cavalry (*Ath. Pol.* 61.5), one might speculate that the archaic liturgy of the same name involved commanding and part-funding the 24 horsemen provided by the twelve *naukrariai* within each tribe. These liturgists would then have been replaced by elected officers – and perhaps public subsidies – when Cleisthenes reorganized the tribal divisions (above, p.74).

This leaves the *trierarchia*, the captaining and part-financing of a trireme, an institution generally thought to have been created by Themistocles in or shortly after 483,[52] on the assumption that there were no publicly-owned triremes before that time. But since there are good reasons to think that the first public triremes in Athens were in fact built during Hippias' reign (above, p.66), the trierarchy may also have been created then. Liturgical trierarchs as captains of publicly-owned triremes and *naukraroi* as captains of privately-owned penteconters would thus have coexisted for a while, and when Cleisthenes abolished the *naukraroi*, the liturgical trierarchy became the mechanism by which captains and

sponsors were found for all warships, now publicly owned. Many former *naukraroi* will still have served as volunteer liturgists, but now alongside their inland peers who owned no private ships and had not previously been able to play this leading role in war. The reformed *naukrariai* covered the cost of the ships (above, pp.66–7), while the naukraric fund, or, if this ceased to exist when the *naukraroi* were abolished, the general public treasury covered the basic wages of the crews, which trierarchs were not expected to pay.[53]

In all probability, therefore, it was indeed Hippias who established the funding mechanism of the liturgy. The distinctive features of the liturgy were that it was not just a matter of paying money but allowed the liturgist a prominent, highly prestigious role in the activity which he (part-)funded – as producer of a performance, sponsor of a contest, or captain of a warship – and that it was at least notionally voluntary, an act of generosity towards the community. This combination of fund-raising with opportunities for status rivalry was ideal for extracting money from a competitive elite – under a tyrant no less than under a democracy. That Hippias allowed men who preferred to avoid the risk, effort and expense of a competitive performance to make a simple payment instead, something which was later no longer allowed, may be a sign that the institution was only just beginning to be established. And perhaps not only in Athens: according to a local historian, Polycrates of Samos, too, resorted to a form of liturgy when instead of supporting the mothers of fallen soldiers from a public dole, he assigned these women to the financial care of individual rich men.[54]

Our stories about Hippias, in short, prove highly revealing. They suggest that there was a genuine historical tradition about this ruler's strenuous efforts to raise revenue. One tactic was to push existing taxes to their limit: this is reflected in the extreme exploitation of public space, and it seems safe to assume that similar attempts were made with other taxes. The other tactic was even more spectacular: the invention of a new mechanism of public funding, the liturgy, which became an integral part of Athens' democratic regime as the main way of mobilizing the wealth of the rich for the benefit of the whole community.

OTHER REVENUES: TRADE, SILVER MINES AND TRIBUTE

Taxes on trade are not explicitly attested but surely were levied in archaic Athens, as elsewhere in the archaic Greek world (above, pp.28–9); presumably it is precisely because these taxes were not unusual in any respect that our sources do not mention them. The volume of trade passing through archaic Athens, while no doubt smaller than it was during the city's heyday in the mid-fifth century, may have been significant. Solon's law prohibiting the export of all agricultural produce except olive oil suggests that Athens was finding it difficult to feed its population from local resources. By implication, Athens was probably already relying on the import of grain, which the law sought to minimize while allowing and encouraging the production of olive oil for export as a regional speciality which paid for some of the grain which needed to be imported. Another commodity which was already being exported in Solon's day and came to be in great demand all over the Mediterranean by the late sixth century was Athenian-made pottery, especially tableware. The precise nature and significance of the trade in ceramics continues to be debated, but at the very least it is clear that sixth-century Athens was part of Mediterranean exchange networks, and thus in a position to raise revenue by taxing trade.[55]

By the early sixth century, Athens was also able to raise revenue from public properties, which were probably leased out by the Captains until Cleisthenes transferred this responsibility to the central control of the Sellers (above, pp.43–5). Most of these properties will have been landed estates from which the treasury drew rents in kind or money, but they presumably also included other resources such as stone and clay quarries and above all the silver mines, potentially a source of great revenue. The silver mines at Laurion were exploited throughout the archaic period, as is shown by the discovery of litharge, a by-product of silver extraction, at Thorikos in the ninth century BC, and by the scientific analysis of lead isotope ratios which reveals that not only some of the earliest Athenian coins but also ingots and scraps in hoards found as far afield as seventh-century Israel and sixth-century Sicily consisted of silver from Laurion. On the other hand, much of the earliest Athenian coinage

used silver from other sources which suggests that the mines were not yet intensively exploited.[56]

It has been suggested that the silver mines were at first privately owned and nationalized only by Cleisthenes, but all our evidence for mines in the Greek world – including Siphnos well before 525 and Thasos and Macedonia by 500 BC – points to public or royal control, and there is no reason to think that things were different in Solonian Athens.[57] Mining concessions will have been leased out to private entrepreneurs, as they were in the classical period. If before Cleisthenes it was the Captains rather than the Sellers who were responsible for leasing out public property, those in charge of Captaincy-districts which included silver mines will have derived a good deal of influence from their authority over the leases of these most valuable public assets. Prominent among those Captains will have been Alcmeonids, who are known to have had estates in and around the mining district in south-east Attica,[58] and their administration of mining leases may have been yet another prop of the family's enduring power and status.

Conversely, when the Alcmeonids went into exile after the assassination of Hipparchus in 514, Hippias may have been able to centralize the administration of mining leases and encourage their exploitation. He certainly had the incentive to do so, since he needed to wage a costly civil war against the exiles and their allies while at about the same time, *c.* 514–512 BC, he lost access to silver mines in the northern Aegean when a Persian expedition occupied this part of the world. The minting of the first Owl coins, which unlike their predecessors were minted from pure Laurion silver, may reflect these developments (below, Ch. 6, pp.124–8). More intensive exploitation of the mines thus probably goes back about 30 years before Themistocles, which means that the strike of 483 BC was no doubt timely but hardly a matter of 'luck'.[59]

Our only indication of how much revenue the city derived from the silver mines is the story in *Athenaion Politeia* that 'in the archonship of Nicodemus [483/2], when the mines at Maroneia were discovered and the city acquired 100 talents from the works, and some people were advocating that the silver should be distributed among the people, Themistocles intervened' and arranged for the building of triremes instead (22.7). The discovery of a new vein of silver would have

occasioned the sale of many new leases, and perhaps also above-average revenues from a tax on silver production, so that public mining revenues will rarely if ever have exceeded 100 talents and may often have been much lower. In Herodotus' version of the story, the plan was to distribute 10 drachmas of silver to each man (7.144.1, cited above, pp.3–4), and given that Herodotus assumed a citizen population of 30,000 (5.97.2) this would have amounted to a bonanza of only 50 talents rather than 100. Fifty talents was almost certainly not enough money to build 100 triremes[60] – let alone the 200 triremes which Herodotus claims were built – but it does not follow that the figure of 10 dr per man is wrong: we should rather infer that the intention was to distribute only about half of the year's exceptional revenue while the rest was retained for public use. A similar arrangement is implied by Herodotus' account of the mining revenues which the Siphnians 'distributed amongst themselves': part of this income was actually reserved for lavish public building, including a monumental agora and *prytaneion* in Parian marble.[61]

A point of crucial importance is that neither Herodotus nor Aristotle suggest that it was regular practice in Athens to distribute (part of) the mining revenue among the citizens. From Herodotus it is impossible to tell whether the planned distribution in 483 was unique or routine, whereas he is quite clear that similar distributions in Siphnos before 525 happened 'every year' (3.57.1). In *Athenaion Politeia* the planned distribution is clearly represented as a one-off: the idea is inspired by a unique windfall and is specifically 'advocated' by 'certain people' (συμβουλευόντων τινῶν) rather than implemented as a matter of course. Only much later, in the versions of the story told by Nepos and Plutarch, are we told that the distribution of mining revenue was a 'habit' or 'annual' in Athens. I would suggest that these later authors did not draw on a different tradition but simply, misguidedly, supplied that detail from a recollection of Herodotus' account of the mines on Siphnos.[62]

One-off distributions of windfall revenue still took place occasionally even in classical Athens and do not prove the persistence of an archaic concept of revenue from mines, spoils and other assets as 'communal' rather than 'public' property which accordingly ought to be distributed

to the community rather than kept or spent centrally.[63] Even in Siphnos, the sums annually distributed were evidently only what was left after large public spending needs had been met. Increases in public spending after 525 BC will have made such surpluses rarer and rarer even in cities with large mining revenues, and we have no good reason to think that they were ever common. For all we know, the planned bonanza of 483 might have been the first of its kind in Athens, and Themistocles' intervention amounted to blocking an unusual proposal rather than breaking with a long tradition. His own proposal to expand the fleet to a size unmatched in mainland Greece was certainly radical, but its financial basis in drawing on income from the mines need not have been anything new, let alone revolutionary.

A final form of regular revenue which did transform Athenian public finance was the 'tribute' (*phoros*) and associated 'imperial' income which accrued to Athens from 478/7 BC onwards. The Delian League formed under Athens' leadership had two kinds of member States: those which provided ships (and troops) for military expeditions, and those who contributed sums of money amounting to a total 'tribute' of 460 talents p.a. (Thuc. 1.96.1–2). It seems self-evident that the money, paid into the treasury of the Hellenotamiai on Delos (above, p.44), was meant to pay the wages of the ships' crews and soldiers. The largest campaigns of the League against the Persian empire involved fleets of 200 ships, which would have cost 100–200 talents a month in wages, so that the tribute was easily enough to cover a typical campaign of two to four months' duration.[64] The story of how Cimon raised four months' wages for the entire Athenian force by ransoming prisoners (above, pp.70–1) shows that the allied fleet would not defray its expenses from the League treasury if it could meet its costs from booty instead.[65] The States which provided ships presumably paid the wages of their own forces initially and afterwards claimed back from the League treasury whatever part of their expenditure was not covered by profits from plunder. As a result, Athens was able from 478/7 onwards to wage war without incurring any of the costs, other than the building and basic maintenance of ships, safe in the knowledge that its military expenditure would be met from the tribute if not from the spoils.

An apparent obstacle to this interpretation of how the tribute functioned is the claim made by Ephorus that the treasury on Delos

contained as much as 8,000 or even 10,000 talents at the time when it was transferred to Athens, which almost certainly happened in 454/3 BC. Some surplus clearly did accumulate on Delos: since full-scale 200-ship expeditions did not happen every year, and some expeditions paid for themselves in plunder, reserves of tribute were large enough to cope with occasional campaigns which exceeded the annual budget, such as the long siege of Thasos in the mid-460s.[66] But a surplus on the scale indicated by Ephorus would imply that the tribute had been left virtually untouched since the foundation of the League, and therefore that Athens and the other cities which provided ships paid all their own military expenses. Another implication would be that (almost) the whole of Athens' surplus at its peak *c.* 450 BC – 9,700 talents according to Thucydides (2.13.3) – consisted of accumulated tribute and that Athens had previously had (almost) no surplus at all.[67]

Some scholars have accepted that the Athenians did continue to pay for their own crews and soldiers until at least 454 BC,[68] but this seems highly improbable. Why would the Athenians have demanded an annual tribute which they had no intention of using, except perhaps as an emergency reserve? Why would the Athenians have imposed on themselves an expenditure of, say, 150–300 talents in wages for 100 ships' crews over three months while never charging any of their allies more than 30 talents in tribute? If the Athenians had somehow decided to sustain the bulk of the League's costs in money, material and manpower from their own resources, why did they completely reverse this policy in 454/3 and start to pay all of Athens' expenses, military and non-military, from the confiscated League treasury?[69] And if there was such a change, why did other fourth-century sources claim that from the outset the tribute was of great benefit to Athenian public finance?[70] It seems much more likely that Athens did from the start recoup its military expenses from the tribute and that, as fewer and fewer allies contributed ships to expeditions, the League treasury became *de facto* an Athenian treasury, which its move to Athens in 454/3 merely symbolized, and its subsequent merger into the Athenian treasury confirmed *de jure*. We should therefore reject Ephorus' claims about the sums transferred from Delos, which may have been based on nothing but the false assumption – perhaps encouraged by anti-Athenian propaganda – that all of the

money which Athens was known to have held in surplus around 450 BC must have been acquired by their take-over of the common treasury a few years earlier.

In sum, while the 'tribute' was not strictly Athenian revenue, it created an international fund which paid for the single largest expenditure in Athens' budget, the wages of its naval crews and troops. From 478/7 onwards, the Athenians conducted most of their wars without cost, while their well-funded campaigns produced profits of which the city enjoyed the lion's share. Apart from surpluses of booty, Athens also acquired permanent imperial revenues such as the income derived from 'the mainland and the mines' of Thasos (Thuc. 1.101.3). By the start of the Peloponnesian War, these imperial revenues other than tribute may have amounted to more than 100 talents, and they need not have been much less by 454 BC.[71] These direct profits of empire, added to sizeable revenues from the silver mines and taxes from no doubt growing trade, increased Athens' income significantly, while its expenditures plummeted as tribute took care of the cost of war. The *eisphora* taxes which had previously been central to public finance rarely if ever needed to be raised again – until new levels of political and military spending during and after the Peloponnesian War made it necessary to start looking for new forms of revenue.

6 From Oxen to Silver to Coins: Media of Public Finance

So long as public finance remains a matter of 'gifts' to and from kings, it can in principle function without a means of exchange, without standards of weight and volume, and perhaps even without measures of value. As it becomes more formal, complex and contractual rather than reciprocal, however, public finance requires controlled measures of weight and volume for expenditures and revenues in kind, as well as a universal measure of value and general means of exchange to facilitate increasingly numerous, varied and precisely calibrated transactions. In the case of archaic Greece and Athens, one part of this story has often been told: the introduction and spread of coinage is among the most significant developments of the age and has accordingly been investigated in great depth. But coinage is merely the culmination of a much longer process starting with the adoption of a distinct weight standard for silver and gold which eventually came to serve as a universal measure of value before ultimately also becoming a general means of exchange in the form of coinage. The earlier phases of this development have been relatively little studied and will therefore be reconstructed in some detail in what follows.

Ancient literary sources for these and other changes in the media of public finance are quite limited and much of what they tell us is misleading. With the aid of archaeological evidence we can nevertheless reconstruct an outline of significant reforms in this area enacted by Solon and the tyrants, which resulted in a fully monetized system of public finance in Athens by 500 BC.

MEASURES OF WEIGHT AND VOLUME BEFORE SOLON

Records of palace administration in Bronze Age Greece show levies raised and payments made in kind, measured by volume or weight. Some measures evidently had the same names as their classical Greek counterparts, implying a degree of continuity, but in other respects standards of weight and volume changed significantly in the Early Iron Age. The basic unit of volume, used to measure grain, wine and oil, is represented in Bronze Age accounts by a pictogram of a cup, which suggests that it was similar to the classical unit known as 'cup' (*kotyle*). Larger measures, however, were quite different. In classical dry measures, 4 cups formed a *choinix*, 16 cups a 'twelfth', 32 cups a 'sixth' and 192 cups a *medimnos* (52.18 litres at Athens), whereas the larger Bronze Age dry measures consisted of 4, 24 and 240 'cups'. In classical liquid measures, 12 cups made a *chous* and 144 cups a *metretes* (38.88 litres), but their Mycenaean Age equivalents were units of 4, 24 and 72 'cups'.[1] By contrast, in measures of weight it is the name of the largest unit, the 'talent' (τάλαντον), literally 'balance weight' and represented in the Bronze Age by a pictogram of a balance, which shows continuity, as does its subdivision into 30 units, while the smaller fractions differ. In Athens, each of the 30 units, called 'stater' (στατήρ), was elaborately subdivided into halves, thirds, quarters, sixths, eighths, twelfths and sixteenths, but its Bronze Age equivalent only into quarters and forty-eighths.[2]

Alongside this talent divided into 30 staters and numerous fractions, classical Athenians also used a talent divided into 60 minas (μναῖ), 1,500 light staters and 6,000 drachmas. The latter is so much more familiar to us from the literary evidence that even experts in the field tend to speak as if the mina and its subdivisions were the normal measures of weight, but epigraphic evidence makes it clear that Athenians used the heavier stater-weight as their standard, and applied the mina only to silver and other selected commodities. Before the hellenistic period, all surviving inscribed weights are defined in terms of staters, rather than minas,[3] and their fractions are only partly compatible with a division into minas and drachmas. A half-stater equalled a mina, while a quarter and eighth were the equivalent of 50 and 25 dr, but none of the other

divisions of the stater corresponded to a round number of drachmas (see Table 1, below).[4] Evidently, there were two separate weight-standards. The distinction was still alive even in the Hellenistic age, when the mina had come to be the main unit in both systems: a decree of this period speaks of 'trade' (ἐμπορικὴ) weights which apply to all commodities 'except those which are explicitly required to be sold in relation to silver',[5] clearly distinguishing between a normal weight standard and a special standard for coined and uncoined silver and other specified goods.

While the normal weight standard derived in part from the Bronze Age, the origins of a separate silver weight system did not lie in Mycenaean Greece. Although artefacts of gold and silver are often mentioned in

'Trade' weights	Until at least 520 BC*	Introduced *c.* 520–480 BC (?)**	Equivalent in silver weight	Introduced *c.* 450–400 BC	Equivalent in silver weight
1 talent	(*c.* 23.25 kg)	26 kg	6,000 drachmas	27.3kg	6,300 drachmas
= 15 double staters	(*c.* 1650 gr)	1736 gr	400 dr	1820 gr	420 dr
= 30 staters	*c.* 775 gr	868 gr	200 dr	910 gr	210 dr
= 60 half-staters	(*c.* 387 gr)	434 gr	100 dr	455 gr	105 dr
= 90 thirds	(*c.* 258 gr)	289 gr	66 dr 4 ob	303 gr	70 dr
= 120 quarters	*c.* 194 gr	217 gr	50 dr	227 gr	52 dr 3 ob
= 180 sixths	*c.* 129 gr	145 gr	33 dr 2 ob	151 gr	35 dr
= 240 eighths	*c.* 97 gr	109 gr	25 dr	113 gr	26.25 dr
= 360 twelfths	(*c.* 65 gr)	72 gr	16 dr 4 ob	75 gr	17 dr 3 ob
= 480 sixteenths	(*c.* 48 gr)	54 gr	12 dr 3 ob	57 gr	13.125 dr

Table 1: Changes in Athenian 'trade' weights and their relation to 'silver' weights
Unattested, extrapolated weights in brackets.

* For weights on this standard see nn.53–5 ** For weights on this standard before 480 BC, see n. 51.

Linear B tablets, weighed amounts of precious metal are listed in just a single surviving tablet, and this gives weights of gold in units of the standard system, the smallest of which weighed *c.* 20 gr.[6] Instead, classical Greek silver weights were derived from a system used in Mesopotamia and the Levant. Here, the largest unit, called *gú[n]* or *biltu* and weighing *c.* 30 kg, was divided into 60 *ma-na* or *manû* of *c.* 470–500 gr, in turn subdivided into 40, 50 or 60 shekels (*gín, šiqlu*) of *c.* 7.8–11.7 gr depending on region.[7] The Greeks borrowed the name of their 'mina' and its relation to the talent from this system, and divided the mina into varying numbers of light 'staters' similar to shekels in weight.[8]

The earliest evidence for Greek familiarity with this system comes from a grave of *c.* 875–850 BC at Lefkandi in Euboea which contained 16 stone weights, which represent all three of the weight standards attested in eighth-century Tyre in Phoenicia: a set of ½, 1, 3, 5 and 20 'Babylonian' shekels;[9] 1 and 3 'Palestinian' shekels; ½, 2 and 4 'Sidonian' shekels. Almost two centuries later, it is in another Euboean settlement, Pithecussae, and appropriately enough in a smith's workshop, that we find the earliest Greek weight which corresponds to a classical silver-standard – 8.79 gr, equivalent to half a Euboic silver stater. That this standard was in use by *c.* 700 BC is confirmed by the fact that the settlements in Chalcidice and Sicily which were founded by Euboeans around this time all used the same weight standard two centuries later when they eventually began to produce coins, although their coinages were in other respects different.[10] The Greeks may thus have adapted Phoenician weight systems to their own use in the eighth century, at about the same time as they adapted the Phoenician alphabet. The leading role of Euboeans in the process explains why silver, gold and other valuables continued to be measured in 'Euboic' talents and minae.[11]

All mainland Greek states adopted the Euboic silver mina of 432–6 gr,[12] as is clear from the weight standards they eventually used for their silver coinage. Although it has been argued that the Aeginetan mina exceptionally weighed 620 gr, the publication of hundreds of classical weights from Olympia no longer leaves any doubt that Aegina, too, used the standard Euboic mina.[13] The later coinage also shows that, just as in the Levant, the mina was subdivided differently in each region (see Table 2).[14] In Euboea, a mina had 25 staters, subdivided into sixths and twelfths; in Corinth, it had 50 staters, subdivided into 'thirds' or

drachmas, half-drachmas, and obols; in Aegina, 35 staters, subdivided into two drachmas of 6 obols each.[15] The Athenians started out with 50 staters, like Corinth, but subdivided in the Aeginetan manner into 2 drachmas of 6 obols; later, they adopted the Euboic system with 25 staters, now of 4 drachmas each.[16] Although attested only for coinage, from the late archaic age onwards, some or all of these subdivisions of the mina were presumably introduced at the same time as the mina itself – as early as the eighth century in the case of Euboea.

The cities of Ionia and East Greece produced coinages on different standards, which suggests that they also used a different system of weight for precious metal: from the late seventh century onwards, electrum was weighed at Miletus in staters of 14.1 gr, a standard also used in (and probably borrowed from) Lydia; the Phocaeans used a stater of 16.2 gr. These Ionian staters were subdivided into thirds, sixths and so forth, down to 1/96ths.[17] An even earlier Ionian system of weights is hinted at in Homer's epics, which frequently describe small weights of gold in terms of 'talents'. The word clearly denotes a precise measure – the talent has fractions and multiples – not just a generic 'weight', yet is used in contexts which imply that the unit weighs no more than a few grammes, like a stater, as opposed to the 25–30 kg of the mainland *talanton*.[18] One Hellenistic scholar claimed that the Homeric talent was the equivalent of the later Persian gold 'daric', which in turn derived from the widely used

Region	**Staters per mina**	**Drachmas per stater/fraction**	**Obols per drachma/fractions**
Euboea	25 of 17.4 gr	Sixths of 2.9 gr	Twelfths of 1.45 gr
Aegina	35 of 12.6 gr	2 drachmas of 6.3 gr	Triobols of 3.15 gr 6 obols of 1.05 gr
Corinth	50 of 8.7 gr	3 drachmas ('thirds') of 2.9 gr	Half-drachmas ('sixths') of 1.45 gr 6 obols of 0.48 gr
Athens, *c.* 530	50 of 8.7 gr	2 drachmas of 4.35 gr	6 obols of 0.72 gr
Athens, *c.* 500	25 of 17.4 gr	4 drachmas of 4.35 gr	6 obols of 0.72 gr

Table 2: Silver weight/coinage systems in archaic central Greece
In all four regions, the silver talent weighed *c.* 26 kg and the mina 432–6 gr.

'Babylonian' shekel (8.3 gr): this may be pure speculation, but is of the right order of magnitude.[19] Similarly, the only (liquid) measure of volume mentioned in Homer, simply called 'measure' (*metron*), was clearly much smaller than its mainland near-namesake, the *metretes*, and probably nearer the size of a *kotyle*, so that a four-*metra* bowl (*Il.* 23.267–8) would have held about 1 litre, a six-*metra* mixing-bowl (23.741) 1.5 litres, and a 22-*metra* tripod-cauldron (23.264) 5.5 litres – all quite realistic volumes.

Alongside the small 'talent' as a weight standard for gold, Homer uses the 'axe' (πέλεκυς) as a weight standard for iron. He describes the prizes in an archery contest as 'violet-coloured iron', specifying a first prize of 'ten axes', a second 'ten half-axes' (ἡμιπέλεκκα). A half-axe makes no sense as a utensil and must be a simple weight of iron; ancient scholars noted the existence of an 'axe' weighing 6 minae in Boeotia, 10 minae in Cyprus, and either 6 or 10 minae in Crete, i.e. about 2.5–4.5 kg.[20] Late archaic inscriptions confirm the use of the 'axe' as a measure, used also to weigh commodities other than iron: in Crete, the scribe Spensithios was obliged to contribute 'ten axes of meat' (δέκα πέλεκυς κρέων) to his *andreion*, while in Cyprus the physician Onasilos received a public wage of '4 axes of silver'.[21] The distinction between the 'talent' standard for gold and the 'axe' standard for other goods is analogous to the mainland Greek use of separate 'silver' and 'trade' weight standards.

Details and regional differences aside, it is clear that by *c.* 700 BC formal measures of volume and at least two parallel systems for measuring weight were widely used across the Greek world. So far as we can tell from the limited evidence in Homer and a few early inscriptions, weights of precious metal and other weighed commodities were used as gifts, prizes, and payments – two talents in legal fees (*Il.* 18.507) and as a 'wage' (*misthos*) for a watchman (*Od.* 4.525–6) – but not yet as a measure of value or as a general medium of exchange.[22]

MEASURES OF VALUE BEFORE SOLON

Universal measures of value did exist by 700 BC, however, and took several quite different forms. In Homeric epic, slaves and goods are assessed in terms of how many 'oxen' they are worth. First prize in a wrestling

contest is a large tripod 'which the Achaeans amongst themselves valued at 12 oxen' while second prize is a slave woman whom 'they valued at 4 oxen' (*Il.* 23.702–5); first prize for javelin-throwing is a bowl 'worth an ox' (23.885). A similar direct comparison of value is made for panoplies of bronze and gold armour, which are deemed worth 9 and 100 oxen, respectively (*Il.* 6.236). The value of payments, too, can be assessed in this way, even when there is no question of using actual oxen to make the payment. One Trojan fetches a ransom of 'a hundred oxen-worth' (*Il.* 21.79–80), but it emerges that part of this amount consisted of a silver mixing-bowl (23.740–7). Even more explicitly Odysseus' enemies promise to 'give you bronze and gold, making up for everything that has been taken from your house in drink and food, each man separately contributing the value of 20 oxen' (*Od.* 22.55–9). Here three years' food and drink are assessed at a value of 20 oxen and retrospectively paid for with objects of bronze and gold assessed at the same value.[23] This measure of value was not just an epic fantasy: the value of prizes awarded at the pan-Ionian festival on Delos was announced in terms of 'oxen', and most importantly 'in the laws of Draco, too, there is the payment of a fine of twenty oxen-worth'.[24]

In the earliest Cretan laws, fines are stipulated in terms of 'bowls' (λέβητες) rather than oxen, and these too were a notional measure of value, as is clear from a law of Gortyn, *c.* 600 BC, which decrees that the offender must 'set up one 10-bowl tripod' (καταιστάμεν τρίποδα ἕνα δ[έ]καλεβήτον). This can only mean that the fine took the form of an actual tripod, but that the minimum value of this tripod was measured in so many 'bowls-worth'.[25] The 1:10 ratio is similar to the one implied in the *Iliad*, where a bowl is worth one ox, a large tripod twelve. The numerous other laws from Gortyn which stipulate fines of between 5 and 100 'bowls' are to be understood in the same way: they prescribe the value of the fine rather than its form. Offenders would not be expected to hand over large stacks of bronze bowls but to present unspecified goods worth the specified amount.[26]

In this light we may also understand the use of drachmas and obols, rather than fractions, as subdivisions of the stater in Aegina, Corinth and Athens. The term 'obol' (ὀβολός) is a form of the word for 'spit' (ὀβελός); 'drachma' (δραχμή) means 'handful'; and a classical temple

inventory uses the phrase 'handful of spits' to describe a set of roasting spits. From antiquity onwards, some scholars have concluded that, before the introduction of silver coinage, real iron spits were used as a form of money. One account of the supposed invention of coinage claimed that it involved taking iron spits out of circulation by dedicating them at the temple of Hera in Argos.[27] A bundle of nearly 100 spits has indeed been found at that sanctuary, while numerous spits were dedicated elsewhere or deposited as grave goods in early Greece.[28] But such spits varied too much in size to represent a standard weight, while on the other hand they did not vary so much that an Aeginetan iron spit could have been worth more than two Corinthian spits as the weight difference between these cities' obols would imply. More probably, the actual spits dedicated or deposited were functional objects which had their own non-standardized material value as well as symbolic value as tokens of the sacrifices and feasts at which they had been used. The incorporation of the 'spit' and 'handful' into coinage, however, does suggest that there was a concept of a generic, abstract 'standard' spit which functioned as a measure of value.[29] Dedicatory inscriptions on stone stelae and bases of *c.* 600–550 BC which refer to the offering as 'a drachma' or 'an obol' also suggest that the 'spit' was used to express value[30] – analogous to the use of the 'ox' in Homer and 'bowl' in Crete.

It is of course likely that oxen, bowls and spits were occasionally given in exchange or payment, but they were in various ways surely too awkward to serve as a general medium of exchange – even bronze bowls and iron spits, which had the advantage of being imperishable and portable, were too bulky to circulate in quantity and too variable in size and quality.[31] Their role as measures of value was thus probably not derived from their role in exchange. A clue to its origin is that all three served a vital function at sacrifices and feasts.[32] The ox was the most valuable of animals sacrificed and eaten, and the ultimate sacrifice, the hecatomb (ἑκατόμβη) corresponds to the highest material value expressed in the epics, 'a hundred oxen-worth' (ἑκατόμβοιος). The meat was roasted on spits, and before sacrificing or eating one washed one's hands in a bowl of water.[33] Quite a few other vessels and implements were used in sacrificing and dining, but a classical inventory of sacred property of the Thespians shows that a bowl and a set of spits were the

irreducible minimum of equipment for a sacrifice, and were used in larger numbers than anything else: in their Heraion, the Thespians kept 35 bowls and 35 sets of spits, alongside 30 tripods, 12 cups, 11 water jars and so forth, while in two smaller sanctuaries they kept nothing but 2 or 3 bowls and matching sets of spits.[34] It must have been the special role of oxen, bowls and spits in communal (ritual) feasts which made them widely accepted measures of value.

Given that according to Homer a bowl could have roughly the same value as an ox, the three measures were presumably alternatives rather than part of a single system. Not coincidentally, therefore, each measure of value was associated with a distinct region: the ox with Ionia (via Homer, Delos and Draco), the bowl with Crete, and the spit with the Peloponnese (via the earliest silver coinages): different parts of the Greek world adopted a different element of the shared range as their standard. None of these measures of value are attested in the Bronze Age Linear B tablets, and it seems likely that they were first developed in the Early Iron Age.[35]

In sum, the Greeks used measures of volume and weight from the Bronze Age onwards, and in the course of the eighth century BC, if not earlier, adopted new standards of weight used primarily for precious metals, borrowed from the Phoenicians and other Near Eastern cultures. Weighed metal was by 700 BC used as gift, reward and payment, but it did not yet serve as a measure of value. Value was expressed instead in terms of oxen, bowls or spits – not defined by weight or volume – by which one could measure everything from food and drink via slaves to gold and silver. Archaic laws show that fines were fixed in these rather impressionistic terms, and the same may be true of other public payments, insofar as they were not defined in volumes of agricultural produce.

PHEIDON, SOLON AND AFTER: ARCHAIC REFORMS OF MEASURES

Fourth-century historians attributed the invention of measures of volume and weight as well as coinage to Pheidon, king of Argos, and they credited Solon with a major reform of Pheidon's measures and coinage. Pheidon's lifetime was dated to several different centuries, but the use

of weights and measures in Greece long predated even the earliest of these, and even the latest date, *c.* 580 BC, is probably still too early for the creation of the silver Aeginetan currency which is attributed to him (see below).[36] Similarly, Solon could not have created Athens' coinage, and was demonstrably not responsible for the system of weights associated with him. We will begin with a close analysis of these unreliable ancient traditions, before going on to reconstruct as best we can the development of archaic weights and measures – a process in which Pheidon and Solon probably did play important roles, even if they were not the roles imagined by fourth-century scholars.

Herodotus' brief account of Pheidon, our earliest, makes none of the extravagant claims advanced by his successors, but merely says that Pheidon 'established measures of volume (*metra*) for the Peloponnesians', and implies that this happened *c.* 600–580 BC (6.127.3). We know that a 'Pheidonian' *medimnos* was still widely recognized, if perhaps not commonly used, in the fourth century,[37] so it seems likely that Pheidon of Argos established a set of measures which quickly came to be adopted across the Peloponnese, probably by way of Aegina and its traders. On Herodotus' date, this development, later inflated into a legend about the invention of measures and coinage, would have taken place at roughly the same time as Solon's reforms.

The tradition about Solon is more detailed and complex. Two contrasting accounts are offered by Aristotle and Androtion. Aristotle speaks of Solon's 'enlargement of measures and weights and of the currency' (*Ath. Pol.* 10.1):

> For under him (i) the measures became larger than the Pheidonian ones, (ii) and the mina, which previously had a weight of 70 drachmas, was filled up with the [current] 100. (iii) The old standard coin was a didrachm. (iv) He also established weights in relation to the currency with the talent weighing 63 minae, and the [additional] 3 minae were distributed over the *stater* and the other weights.
>
> ἔπ᾽ ἐκείνου γὰρ ἐγένετο καὶ τὰ μέτρα μείζω τῶν Φειδωνείων, καὶ ἡ μνᾶ, πρότερον ἔχουσα σταθμὸν ἑβδομήκοντα δραχμάς, ἀνεπληρώθη ταῖς ἑκατόν. ἦν δ᾽ ὁ ἀρχαῖος χαρακτὴρ δίδραχμον. ἐποίησε δὲ καὶ σταθμὰ πρὸς τὸ νόμισμα, τρεῖς καὶ ἑξήκοντα μνᾶς τὸ τάλαντον ἀγούσας, καὶ ἐπιδιενεμήθησαν αἱ τρεῖς μναῖ τῷ στατῆρι καὶ τοῖς ἄλλοις σταθμοῖς. (*Ath. Pol.* 10.2)

Ambiguities in this formulation have inspired much debate about Aristotle's meaning. The interpretation of the final clause (iv) is crucial. It is often argued that 'established weights in relation to [πρὸς] the currency' means 'established the weights of coins', making them either heavier or lighter than their 'trade' weight equivalent.[38] Yet Aristotle here refers to a talent subdivided into *staters* and other *weights*, which to a classical Athenian could only mean 'trade' weights rather than coin weights, as the epigraphic evidence (n.3, above) shows. When Aristotle said that the reform established weights 'in relation to' currency, he must have meant that Solon brought the system of 'trade' weights into a specific ratio with the system of silver coin weights, making the talent equivalent to 63 minae of coins, and increasing smaller weights by the same proportion: the stater was fixed at 210 coin drachmas, a 'third' at 70, a 'sixth' at 35.[39] Two fourth-century weights of an eighth and a sixteenth of a 210-drachma stater actually have their weight in coin-drachmas inscribed: 26 dr 1.5 obols, and 13 dr 0.75 obols. Later increases in weights were also defined in terms of silver coins: in the second century BC, the 'trade' mina was raised from 138 to 150 dr.[40]

Since clause (iv) concerns a reform of weights, clause (ii) must concern a reform of currency, as the reference to minas and drachmas in any case suggests. The discussion thus does not follow the sequence 'measures, weights, currency' presented in Aristotle's opening summary, but since the reform of weights required an explanation in terms of coins, it made sense to explain the reform of currency first.[41] A change from a mina of 70 to a mina of 100 drachmas could mean either that the weight of the mina stayed the same while the weight of the drachma was reduced or that the weight of the drachma stayed the same while the weight of the mina was increased. Aristotle meant the latter, as is clear from his reference to an 'enlargement' of currency, from his statement that 70 drachmas was the 'weight' of the old mina (not simply the number of units into which it was divided) and from his description of the reform as 'filling up' the mina. In other words, Aristotle thought that a mina had previously consisted of 70 dr, and thus weighed 70 x 4.32 = 302 gr, but since the time of Solon consisted of 100 dr and weighed 432 gr.[42]

Aristotle, in sum, believed that Solon had (i) made measures of volume larger, (ii) increased the value and weight of the silver mina by

adding 30 drachmas to it, (iii) minted mainly two-drachma pieces,[43] and (iv) established a system of larger trade weights, each 1/20th heavier than its equivalent in the silver weight system.

A different interpretation comes from Androtion's *Atthis*, which attributed to Solon

> the enlargement of measures and the valuation of currency. For he created a mina of 100 drachmas, when it had previously consisted of 73, so that those who discharged their debts benefited greatly since they paid back an amount which was identical in number but smaller in value, while those who collected debts suffered no financial harm.
>
> τὴν […] τῶν τε μέτρων ἐπαύξησιν καὶ τοῦ νομίσματος τιμήν. ἑκατὸν γὰρ ἐποίησε δραχμῶν τὴν μνᾶν πρότερον ἑβδομήκοντα καὶ τριῶν οὔσαν, ὥστ᾽ ἀριθμῷ μὲν ἴσον, δυνάμει δ᾽ ἔλαττον ἀποδιδόντων, ὠφελεῖσθαι μὲν τοὺς ἐκτίνοντας μεγάλα, μηδὲν δὲ βλάπτεσθαι τοὺς κομιζομένους. (*FGrH* 324 F34; Plut. *Sol.* 15.4)

The notion that the old mina consisted of 73 rather than 70 drachmas is puzzling and may be a manuscript error. Alternatively, Plutarch may have garbled Androtion's account as he summarized it from memory, either simply conflating the figures of 70 and 63, or else muddling a claim which Androtion may have made to the effect that the 'trade' mina had been 5 per cent heavier than the coin-mina even before Solon and thus weighed 73.5 drachmas.[44] Otherwise, Androtion's view on Solon's reform of coinage was evidently the opposite of Aristotle's: he spoke of a new 'valuation', not enlargement, and envisaged the weight of the mina staying the same but being subdivided into a larger number of drachmas. As a result, those who owed amounts in drachmas paid back less, while still notionally meeting their obligations. Plutarch (ibid.) explains that according to Androtion Solon did not cancel debt but merely alleviated it by this means; Aristotle disagreed (*Ath. Pol.* 6.1).

So much for the tradition: how much is history? The claim that Solon increased the size of measures of volume, the one point on which Aristotle and Androtion agreed, may be based on no more than the knowledge that 'Pheidonian' *medimnoi* and *metretai* were smaller than their classical Athenian counterparts and the fourth-century belief that Pheidon's system had once upon a time been used everywhere in the Greek world. On Herodotus' account, by contrast, Pheidon was a contemporary of

Solon's and his influence was confined to the Peloponnese, so there is no reason to think that the Athenians ever used Pheidonian measures or that Solon 'enlarged' them. In the same way, Solon's alleged reform of the silver mina may have been inferred from the difference between the classical Athenian and Aeginetan silver weight systems. The Aeginetan mina, supposedly invented by Pheidon, consisted of 70 drachmas and since fourth-century scholars assumed that Athens had originally had the same system, it will have seemed to them a logical conclusion that Solon had created either a lighter drachma (Androtion) or a heavier mina (Aristotle).[45] The latter idea is in fact certainly not true, since, as we have seen, the silver mina was of the same weight across the Greek mainland and originated in eighth-century Euboea. The notion that Solon also struck coins from silver is clearly unhistorical: the numismatic evidence shows that Athens started minting only *c.* 545 or even 530 BC (below, pp.124–8).

Finally, Aristotle's claim that Solon established a 'trade' talent weighing 6,300 silver drachmas, a 'trade' stater weighing 210 silver drachmas, and so forth, is disproved by the archaeological evidence. Trade weights on this standard are well-attested at Athens and Olympia, but none older than the late fifth century; in both places this standard coexisted with a lighter stater weighing about 200 dr and a heavier one of about 220 dr.[46] Conversely, the few surviving weights older than the Persian Wars all belong to lighter standards (see below). The 210-dr stater was thus not introduced until more than a century after Solon. Perhaps this happened in connection with the imposition of unified measures, weights and coinage on Athens' subject allies in the 440s or 420s, or else the new standard may have been introduced as late as 403 BC, as part of an alleged return to 'Solonian' measures, weights and laws under the restored democracy.[47] Its main advantage may have been that it served to integrate measures of weight and volume. Grain, and perhaps other agricultural produce, while traded by volume, was also measured by weight, and a decree of 374/3 BC shows that a *medimnos* of barley and five *hekteis* of wheat were supposed to weigh one talent. The 'trade' talent may thus have been raised to 63 minas to establish a convenient weight standard for Athens' major import, grain, which due to variations in weight and density could not be measured with equal precision by volume.[48]

The entire surviving ancient tradition about Solon's reform of measures and weights thus appears to be based on inferences made from contemporary fourth-century practice, some clearly wrong, others of highly dubious validity. In order to understand what did happen in archaic Athens, we need to set Aristotle and Androtion aside, and consider the other evidence, which, limited as it is, does tell us something about archaic weights and measures, and above all about a crucial new measure of value.

Starting with measures of volume, it is likely that the classical Attic *medimnos* went back as least as far as Solon. The wealth of the Athenian property classes was measured in *medimnoi*, so one could not increase the size of this measure without thereby raising the property thresholds for political office-holding, which would have gone against the trend of widening political participation. Reducing the size of the measure would have lowered this threshold, but the implication would be that the high property requirements attested in classical Athens had been even higher under Solon and that his reforms left power in the hands of a very narrow elite.[49] Given these political implications, Solon will probably have prescribed a legal size for the *medimnos* and other measures of volume. This official size need not have entailed a change to conventional measures, but it may have done, and if we accept Herodotus' account of Pheidon, it is tempting to think of Solon regulating standards at Athens at the same time as measures were being standardized across the Peloponnese. A couple of fourth-century figures allow us to deduce somewhat speculatively that an Attic *medimnos* was 12 per cent larger than its contemporary Pheidonian equivalent.[50]

Turning to measures of weight (see Table 1), we find that the majority of the rather few surviving early weights correspond to the silver weight standard, with a 200-drachma stater of *c.* 860 gr. At Athens, before 480 BC, we have an inscribed stone 'double stater' of 1,737.5 gr (= 4 minas of 434 gr); a bronze 'hemistater' (mina) of 426.63 gr which has lost a few grammes through damage; an uninscribed weight of 215.40 gr, with a Gorgoneion 'exactly like the type known from the so-called *Wappenmünzen*' (Pernice 1894: 69) and therefore surely archaic, presumably a quarter-stater (half-mina); and two weights marked with an owl, 71.42 gr and 69.9 gr, probably twelfth-staters (= mina of 420–8 gr).[51] At Olympia, the sole deposit

which can be dated archaeologically to before 450 BC contains only weights on this same silver-standard, which also continue to occur in later classical finds at both Athens and Olympia.[52] Such weights cannot have been designed for the weighing of silver only. At Olympia, they were by far the largest category, which would surely have consisted of normal 'trade' weights, and at both sites we find fractional weights that do not correspond to round numbers of drachmas (above, pp.108–9), and thus of little use in weighing silver. We must conclude that sometime before 480 BC, Athens, like Olympia, brought an originally distinct system of trade weights in line with its system of silver weights.

We may have some scant remains of the earlier trade weight standard. A well in Athens which was filled up with debris in 480 BC contained three weights marked as public property: a 'sixth' of 126 gr (stater of 756 gr), a 'quarter' of 190 gr (stater of 760 gr) and a 'stater' of 795 gr.[53] They must have been in use until at least the late sixth century because the well contained no pottery older than 525 BC.[54] Perhaps these weights were deliberately dumped because they were found to be inaccurate, rather than part of the general fill of the well, but they have a suggestive parallel at Olympia in the form of four exceptional 'star'-shaped weights, dated epigraphically to the late sixth or early fifth century and weighing about 97 gr each, probably eighths of a stater of *c.* 775 gr, and thus in the middle of the range of the Athenian weights.[55] The evidence is hardly sufficient to draw confident conclusions, but it seems likely that we have here two sets of trade weights of a standard which was significantly lighter than the silver-standard and went out of use in the decades around 500 BC. If so, it will have been at this time that trade weights were aligned with the silver-standard, presumably because the increasing scale and importance of silver coinage during this period (see below) made it convenient to use the same standard for all commodities.

One final reform for which Solon himself almost certainly *was* responsible but of which our sources were unaware is the transition from 'oxen-worth' to weighed silver as the measure of value used in public transactions. Draco's laws, *c.* 620 BC, prescribed a fine of 'twenty oxen-worth' for one or more offences which our source (Pollux; above, p.113) does not specify. In laws reliably attributed to Solon, by contrast, fines are always expressed in drachmas, with 100 dr as the highest attested

penalty.[56] I would suggest that fines in 'oxen-worth' were the norm in Draco's laws, that 20 oxen represented the heaviest fine, and that Solon converted Draco's penalties into drachmas at a rate of 5 dr per ox. This would explain why Demetrius of Phaleron, who studied both lawgivers, concluded that an ox was worth 5 drachmas in Solon's day.[57] The conversion rate may have been lower than the true value of an ox, and represent a deliberate reduction of the penalties prescribed in Draco's proverbially harsh laws.[58]

In theory, Solon's 'drachmas' might have been notional sets of spits serving as an approximate measure of value, or even actual sets of iron spits if one believes that such things were used as 'utensil money', but in practice this is very unlikely. For one thing, it is not obvious what would have been the point of switching from one traditional measure of value to another, especially since the 'ox' was associated with Ionia but the 'spit' with the Peloponnese. More importantly, when Solon's laws mention public payments, these are made in silver – from the Captains' fund, as we have seen (p.41) – which makes it highly probable that fines were collected in silver as well.[59] One law, less reliably attributed to Solon but of archaic date, at any rate, implies that silver was current enough to be borrowed at interest by private individuals.[60] Combined with the existence at least a century earlier of weight standards for precious metals in the Ionian world, and specifically for silver in neighbouring Euboea, these considerations point firmly towards the conclusion that the drachmas in Solon's laws are to be understood as weights of silver, precursors of the later drachma coins.[61]

In Attica, the transition from 'oxen' to weighed silver as the main measure of value thus occurred in the 25 years or so between Draco and Solon, and Solon's laws may have been instrumental in imposing the new standard. And if Solon was indeed behind this innovation, he was in all likelihood also responsible for the division of the silver mina into 100 drachmas. This centesimal system seems to us, in retrospect, almost self-evident, but it had not previously been used anywhere, either in the Near East or by any of Athens' neighbours, who divided the mina instead into 70 (Aegina) or 150 (Corinthian drachmas, Euboic sixth-staters). Indeed, it may not have been the convenience of a division into 100 units that dictated the size of the drachma, but the

size of the drachma that determined the division: a weight of 4.3 gr may have been chosen precisely to create the equivalencies attested in Solon's laws, where a silver drachma has the same value as a sheep or a *medimnos* of barley (above, p.89).[62] In any case, the centesimal system is unlikely to have developed spontaneously and it must have been imposed by law, surely under Solon rather than later when Athens first began to mint coins. Here, then, we have the historical kernel of the story told by Androtion: Solon introduced a new, distinctive measure of value, which Androtion was almost bound to misinterpret as a reform of coinage.

Although the division of the mina into 100 drachmas was unique, the use of the drachma and obols as such, rather than the stater and fractions, was borrowed from the measures of value used in the Peloponnese. This suggests that Corinth and Aegina had already converted their traditional iron 'spit'-measures into a new silver weight standard before Athens made the transition. In this context, we may after all discern a historical kernel also in the story that Pheidon invented silver coinage and took the previous currency of iron spits out of circulation: the truth may be that he replaced the 'spit' with weighed silver as a universal measure of value in determining public fines, payments and the like,[63] shortly before Solon and Athens followed suit.

Even without the spurious reforms attributed to him, Solon thus brought about a major change in public finance by introducing, or at least formalizing, the use of the Euboic silver mina – along with a distinctive Athenian division into 100 drachmas – as the main measure of value in public transactions. Agricultural levies were still in kind, but even these could now also be valued in silver at a conversion rate of a *medimnos* or a sheep for a drachma. The change is likely to reflect two key developments in public finance: the increasingly contractual rather than reciprocal nature of transactions and the growing volume of public business. The former required a more precise measure of value than 'oxen' or 'spits', while the latter required a conveniently portable and storable means of payment, a purpose well served by precious metal bullion. At about the same time, similar systems came into force in the Peloponnese – and the first actual coins began to be minted in Ionia.

WAPPEN, GORGONS AND OWLS: COINAGE IN ARCHAIC ATHENS

The final stage in the archaic development of media of public finance was the introduction of coinage, i.e. pieces of metal with a value controlled and guaranteed by the State, as indicated by a design stamped on the metal. Whether coinage was invented in Lydia, as our earliest Greek sources say, or in the Greek cities of Ionia, where the earliest (electrum) coins are found, continues to be a matter of debate. The earliest find, at Ephesus, is archaeologically dated to between 650 and 560 BC, and numismatists are increasingly inclined to date the oldest electrum coins to 600 BC or later.[64] The date of the earliest silver coinages is currently thought to be no earlier than 575 and possibly as late as 525 BC in Aegina and Corinth; Athens was among the first mainland Greek cities to strike its own coins, starting *c.* 545 at the earliest and 530 at the latest.[65] We will first reconstruct the early history of coinage at Athens and then investigate the relation between coinage and developments in public finance.

The earliest fixed point in the history of Athenian minting is that an early type of 'Owl' – a 4-drachma piece with Athena's head on the obverse and her owl, an olive branch and the abbreviation AΘE for 'Athens' on the reverse – was used far away in the Persian capital Persepolis to seal a document in 499 BC.[66] How long before this date Owls were first struck is not clear, and the origin of their predecessors, the so-called 'heraldic coins' (*Wappenmünzen*), is even less certain. The relevant coin hoards, which might have provided a date from archaeological context, can in fact be dated only by the numismatic evidence itself so that there is a danger of circular argument.[67]

The number of different dies used to strike the obverse of the Owls gives some indication of date: the attested general range of use of obverse coin dies is between 0.8 and 10 per annum, and the known number of dies for the earliest types of Owl is 29, so that it might have taken as few as 3 or as many as 34 years to strike these coins. Accordingly, the earliest date suggested for the start of Owls is *c.* 525 BC, but a date just before 500 BC is also possible.[68] The total number of known obverse dies of the next three types of Owl, all minted before 480/479 BC, is at least

183, which suggests something close to the maximum rate per annum.[69] Although this high output no doubt reflects the productivity of the silver mines and heavy spending on the navy in the 480s, it is unlikely that the frequency of coining accelerated from the lowest to the highest rate around 500 BC, given that Athens already had substantial financial needs under Hippias. A more plausible starting date for the Owls is therefore 515–505 BC.

This period happens to be the most turbulent in Athenian history, when the city was in effect suffering an extended civil war which began with the assassination of Hipparchus in 514 and ended with the Athenians repelling a Spartan invasion force and proceeding to conquer Chalcis in 506 BC. The fall of the tyranny of Hippias in 510 or the reforms of Cleisthenes in 508 are among the possible occasions for the introduction of the new coin type: classical Athenians emphatically celebrated these events as the beginning of 'freedom' and 'equality', so that they might well have dissociated themselves from the old regime by creating a new-look currency.[70] On the other hand, coin types are known to have survived changes of regime elsewhere in Greece, and some evidence points to Hippias as the creator of the Owl.

Most directly, a unique Owl obol has the usual olive twig replaced by an ear of wheat, and the label ATHE(NS) replaced by HIP(PIAS): even if this coin was minted by Hippias in exile, perhaps at Sigeum where he ruled until at least 490 BC, it is hard to see why he would have adopted the Owl type if it had been introduced at Athens only after his deposition, as an anti-tyranny statement. More probably, he used this iconography because it was he who introduced Owls at Athens while still in power.[71] In addition, there is the ancient tradition that Hippias 'rendered existing Athenian currency invalid' and had all the collected silver re-minted 'with a new design' (Ch. 5, pp.97–8, above). Two archaic hoards found in Attica each contain a variety of the earlier types of 'heraldic' coin including the latest type, the *Gorgoneion*, which suggests that new types did not invalidate older ones. Neither hoard included any Owls. By contrast, one of the two other known archaic Attic hoards contained only Owls, while the second included only Owls and smaller denominations of the problematic 'wheel'-type, to which we shall return. If this is not mere

coincidence, it suggests that the currency with which Hippias invalidated older issues was the Owl.[72]

If so, and if this happened after *c.* 515 BC, as suggested, Owls were first coined at a time when Hippias came under armed attack from rich Athenian families in exile, led by the Alcmeonids, with military backing from Sparta (Hdt. 5.62–3; [Ar.] *Ath. Pol.* 19). In that context, the adoption of the first coin type with an emphatically Athenian iconography – featuring not just the patron goddess Athena, but an owl alluding to the Athenians' boast of superior intelligence (Hdt. 1.60), an olive twig referring to Athens' famed olive oil, and of course the unambiguous legend 'Athe(ns)' – may be explained as an effort by Hippias to assert his legitimacy as ruler of the city. His decision to opt for such symbolism was surely crucial to the survival of the Owl after his fall: Athenians could find themselves in its 'national' symbolism, regardless of the prevailing political regime. If the story of Hippias' demonetization of previous coinages does relate to the introduction of Owls, the change of type also had the twin practical advantages of raising money for Hippias by bringing in re-minting fees, and undermining the credit of his enemies in exile, much of whose funds would have been in the shape of 'heraldic' coins, now declared invalid.

Before the Owl, Athens produced a large number of different types of coins, which were once believed to have been privately minted by aristocrats who stamped them with a family coat of arms; hence the name *Wappenmünzen*, 'heraldic coins'. But there is no evidence that Athenians even had a concept of a family blazon, and in any case most of the designs on the coins are too generic to have served as such. Among the most common are four types of horse,[73] which would suit almost any elite family, not least Hippias himself and his brother Hipparchus, with their horse-based names.

The most common design is the Gorgon, which can easily be interpreted as an Athenian national emblem since, like the Owl, the image alludes to Athena, who wielded the Gorgon's head as a weapon to strike terror into her enemies. Again like the Owls, Gorgons were struck as 4-drachma pieces, twice as valuable as the largest denomination of the other heraldic coins. Two-drachma Gorgons were also minted, probably at the same time as the larger denominations. The 16–19 attested dies could have taken

anywhere between 2 and 20 years to produce. The Gorgoneia are stylistically close to the Owls and probably immediately preceded them.[74]

Almost as common are three variations of a wheel emblem. A sizeable number of the smaller denominations of this type appear in barely worn condition in an Attic hoard containing mainly Owls of the late 480s BC, which suggests that these 'wheels' continued to be minted alongside Owls. Since the emblem also features on coins of Chalcis – the wheel surely stands for a chariot, and the ruling class of Chalcis were known as *Hippobotai*, horse-rearers – the 'heraldic' wheel-type may in fact have been minted at Chalcis rather than Athens. In early hoards, the wheels are found alongside coins of Chalcis' neighbour Eretria as well as *Wappenmünze*n, and their later prominence in Athens may be explained by Athens' control over Chalcis: from 506 to at least 490 BC Chalcis was occupied by 4,000 Athenian settlers.[75]

If the 'wheels' were minted in Chalcis, we are left with ten attested types of didrachm before the Gorgons, including the four types of horse, to which we should add another four types which survive only on small fractional coins but which must surely have existed in larger denominations as well. A small number of coins with similar designs, but struck in electrum, apparently on the Phocaic standard, are also known.[76] For all but the two most common horse types, only one or two obverse dies are known; the total stands at 26 which again could have spanned anywhere between 3 and 30 or so years. But if it is true that Hippias tried to re-mint all older currencies and replace them with Owls, then clearly the original output of 'heraldic' coins must have been much larger. Given that some of the types have barely survived, a few may have been lost altogether, and originally there may have been 15 types or more.[77]

Why these early types changed so often, and when they began, is hard to tell. Ever-changing designs are not unique to the 'heraldic' coins but are also a feature of numerous early electrum issues in eastern Greece, which may be a sign that they were minted in an *ad hoc* fashion to meet occasional expenditures and that the production of a regular, recognizable 'national' currency was not yet a prime concern for those who minted the earliest coins. If new types were struck on average once a year, heraldic coins including the Gorgons would go back some 20 years

before the introduction of the Owls, which gives a start date of *c.* 535 BC. If issues were less frequent, their origins could lie near the start of the reign of Peisistratus, 546–527 BC. This range of dates suggests a connection between the introduction of coinage and the increase in public spending under the tyrants which deserves a closer look.

COINAGE, PUBLIC SPENDING AND ECONOMIC DEVELOPMENT

The early development of coinage at Athens can be largely explained in terms of changes in public finance. *Wappenmünzen* were first created when Peisistratus needed to pay for a standing body of soldiers as well as major building works at home, and to fund expansionist ventures abroad such as the long war over Sigeum. Gorgons with their 'national' symbolism and double value probably came in during Hippias' reign, as expenditures grew and new sources of revenue were tapped, perhaps from the start or conceivably as late as 514 BC, when according to tradition he disarmed the citizen militia (above, p.72) and needed greater funds than ever to pay for mercenaries to fight off the exiles trying to force a return home. Alternatively, 514 may have been the date when Hippias introduced Owls. An even more attractive possible date for the Owls is 512 BC, when the exiles raised the stakes by winning – allegedly through bribery – the support of a foreign power, Sparta, which launched an invasion of Attica. At this point Hippias would have had a particular incentive to pay his supporters with coins displaying patriotic Athenian imagery, while at the same time weakening his enemies' financial position by invalidating older currencies.[78]

The second group of Owls is associated with some unusual low denominations, whose imagery has been attractively explained as commemorating the overthrow of Hippias,[79] which suggests that it started in 510 BC or shortly thereafter. We cannot confidently date the start of any of the other five groups of Owls before 480 BC, but we know of several occasions which called for large-scale public funding. The drop in expenditures after the fall of Hippias and the restoration of the militia army was off-set by Cleisthenes' creation of a new all-trireme public

navy, first deployed against Chalcis in 506, followed by the fortification of Piraeus in 493 and then the expansion of the fleet for the wars against Aegina and Paros, 491–489, before ship-building under Themistocles took naval spending to a new level in 483–480 BC. Finally, an apparent decline in the output of the mint after 480 may also be explained in terms of naval funding, despite the intense activity of the navy in this period, since from 477/6 onwards Athens defrayed the cost of expeditions from the Delian League treasury (above, pp.104–6) and could afford to strike fewer new coins.[80]

We can make a tentative estimate of how much money Athens minted from *c.* 512 to 480 BC. On the basis of some experimentation, epigraphic evidence, and comparative evidence from minting in the Middle Ages, it has been suggested that a single obverse die could on average produce between 15,000 and 30,000 coins,[81] i.e. 10–20 talents in tetradrachms, or half that in didrachms. Given a total of 43–8 known obverse dies for 'heraldic' didrachms, including Gorgons but excluding wheels, this implies an output of 215–480 talents, to which we should add 6 dies for Gorgon tetradrachms or 60–120 talents. The total is 275–600 talents over 20–30 years, or somewhere between 10 and 30 talents p.a., which falls far short of covering the annual wage bill of 40 talents to keep a standing force of 1,000 mercenaries (Ch. 4, p.73), let alone all other public expenses. This tends to confirm that the original issues are likely to have been larger, and that much has been lost as a result of their demonetization by Hippias. By contrast, the 14 dies of the first group of Owls would have produced 140–280 talents, and if they were minted in the last two years of Hippias' reign, as suggested, output would have been 70–140 talents p.a., which might have covered his expenditures. The minimum 198 dies of the next five groups of Owls would have produced 2,000–4,000 talents over the period 510–480 BC, an average of at least 66–133 talents p.a., much the same as in Hippias' final years, though output will have been lower at the start and higher at the end.[82]

Newly minted coins were not, of course, the only source of revenue for the State, and conversely we cannot be sure that all minted coins were put into circulation through public spending, as opposed to private spending by owners of concessions in the silver mines. Even so, Athens' output of large-denomination coins does not seem much larger than its public

spending needs required, and its archaic Owls may have been produced primarily as a means of payment by and to the State, rather than as a more general medium of exchange. In this respect coinage was a logical development from the use of weighed silver in public finance: as the number and frequency of transactions continued to increase, the need for laborious weighing of individual pieces was removed by producing standardized units, certified with a stamp that not only guaranteed the weight but also identified the state that made the payment.

This is not the whole story, however. The smallest amount known to have been imposed as a tax or paid as a dole in Athens is 1 obol (0.72 gr).[83] Yet among the *Wappenmünzen* we also find half- and quarter-obols, which would have served little purpose in public finance. Few specimens of such tiny denominations survive, but that must be largely because they were not normally hoarded, unlike the almost 100 times more valuable tetradrachms. Early excavations may also often have overlooked these minute coins. An exceptional hoard from *c.* 525 BC shows that denominations as small as 'heraldic' half- and quarter-obols were produced in vast quantities outside Athens: alongside small discs and scraps of silver, this hoard contained 353 coins of *c.* 0.4 gr and 552 coins of *c.* 0.2 gr, possibly from Colophon, struck from hundreds of different dies which suggests that they were originally minted in their millions. So many coins of so little value can really only have served as a medium of small-scale, local, private exchange and retail trade, and it seems likely that the same was true of low-denomination coinage elsewhere, including Athens.[84]

Indeed, the classical Athenian system of paying soldiers and oarsmen a wage in silver with which they purchased their own provisions on campaign relied heavily on the availability of local markets where silver could be exchanged for food and drink. As we have seen, this system is likely to go back at least to the adoption of the trireme as the dominant warship, when the scale of naval warfare became too large to sustain 'Homeric' logistical methods (above, p.69). So we may infer that the growth of local and retail trade and the growth of public finance in Athens were two parallel developments which mutually reinforced one another and stimulated the introduction and spread of coinage. In both fields, the increasing number and complexity of transactions

became unmanageable without a universal medium of exchange and payment. The obvious candidate for this role was weighed silver, which had become a universal measure of value and a means of state payment under Solon. Coined silver facilitated a wide range of transactions: large denominations expedited public payments while small denominations expedited exchange in marketplace and shop; the ease with which one could convert silver into goods in the local marketplace made it possible to pay all public wages in silver, and the extensive use of silver for public wages and fees encouraged the further growth of local exchange and retail trade.[85]

This scenario does not necessarily explain the introduction of coinage everywhere. The original electrum coinage of Ionia and Lydia was probably too valuable for retail trade – in electrum, even the tiniest denominations (1/96th of stater, 0.15 gr) were worth as much as 2 Athenian obols – and may have served simply as a means of making public payments. The names of individuals such as Phanes and 'Walwe' inscribed on some types might identify the king or tyrant who made the payment. The use of these coins predominantly in transactions of this kind may also help solve an old conundrum: why electrum, an amalgam with a variable gold content and therefore variable intrinsic value, was used for coins. The answer may be that, unlike in a negotiated exchange between equals where the precise value of a coin would have mattered a great deal, the recipients of payment from their rulers were in no position to argue, especially if the payment was notionally a gift.[86]

But even in Ionia and Lydia silver coinage was introduced around 550 BC, and the gold content of the few electrum coinages that did not go out of use was thereafter strictly controlled.[87] This may indicate a new use for coinage in private market exchange and extended use in public finance as the result of economic and political developments of the kind sketched for Athens. The same may be true of the earliest silver coinages of mainland Greece: in Aegina half- and quarter-obols were minted, as at Athens, while at Corinth the obol itself weighed only about half as much as an Aeginetan obol. Aegina's and Corinth's famed involvement in overseas trade is likely to have stimulated internal trade as well, and their equally famed naval power will have required state payments on a large scale. Indeed, if late archaic Athenian military pay was 4 obols

a day (above, p.75), this slightly odd amount may well reflect the rate of pay being offered by these neighbours and rivals: 4 Attic obols was the nearest equivalent of 3 Aeginetan obols, which was the normal Peloponnesian rate of military pay in the late fifth century (Thuc. 5.47.6), and the exact equivalent of a Corinthian 'third' and a Euboic 'sixth', the largest fractions of a stater in these two cities and as such a convenient daily wage for soldiers and rowers.

A third potential factor in the creation of coinage may have been the facilitation of overseas trade, but in practice this seems to have been true only in Aegina, if anywhere. Aeginetan silver is dominant in several early hoards from Crete and the Cyclades (*IGCH* nos 1, 6–8) and easily outnumbers even local Corinthian currency in a hoard at Isthmia as late as 480 BC (*IGCH* no. 11). Overseas trade does not seem to have been a significant factor elsewhere, however, since other early coinages barely circulated outside the city of origin.[88] Even Athens' earliest Owls, which have sometimes been seen as trade-oriented currency, are initially attested only in small numbers outside Athens and Euboea (*IGCH* nos 9–10).[89]

If early electrum coinages were used primarily as a means of payment, they were little more than a continuation of the Homeric 'talent' of gold and analogous to the contemporary uncoined silver weights of mainland Greece. Paradoxically, it was the later silver coinages which constituted the greater innovation, insofar as they served as a universal medium of exchange as well as means of payment. A measure of their impact on public and private transactions is the raising of older 'trade' weight standards to bring them in line with silver weights. The Athenian stater was made to weigh two minae of silver between 525 and 480 BC, as we have seen; probably rather later, but still before 450 BC, the silver mina became the standard 'trade' weight at Olympia, and presumably across the Peloponnese (above, pp.120–1).

Yet the broader impact of silver coinage should not be overstated. Its role as a universal measure of value, which some see as a radically new phenomenon, had already been played by uncoined weights of silver from the late seventh century onwards, and by 'oxen', 'bowls' and 'spits' before that. The notion that there had once been closed 'spheres of exchange', which had kept prestige goods in the hands of 'aristocrats' alone, until coinage broke down the boundaries, is without foundation. As we have

seen, already in Homer, food and drink and precious metals could be exchanged for one another on the basis of a valuation in 'oxen-worth'.[90] Coinage was not even a more precise measure of value than simple weighed bullion had been; it was merely a more convenient means of payment and exchange[91] – at the cost of being a rather less impressive form in which to store of wealth than, say, gold and silver plate, despite the artistic merit of many coinages.

Coinage thus did not in itself fundamentally change the nature of economic transactions, but it did create a medium which allowed archaic trends towards greater scale and complexity in both public finance and private exchange free rein to develop. What is more, Hippias' ability to invalidate currency shows that coins were already more than pieces of silver whose weight was guaranteed by the State: they were also controlled by the State, which had the power to exclude any type of coin from circulation, at least for public use, even if its weight and quality met all standards. Such a concept is explicitly attested in a contemporary law of Eretria, which demanded payment of fines in 'approved and sound money' (χρέματα δόκιμα καὶ *h*υγιᾶ).[92] By implication, the State also already had at least in theory the power to impose token coinages. These were rarely used until much later, but at least one archaic example is indeed known: the gilded lead coins issued by Polycrates of Samos in the 520s.[93] The adoption of coinage thus not only extended and facilitated public finance, but also implied a new conception of the power of the State.

7 Conclusion: Public Finance and the State in Archaic Athens

The story of archaic Athens is most often told as an inspirational tale of the struggle for democracy, taken up by Solon, swept aside by the dictatorship of Peisistratus, and finally won by Cleisthenes and his successors – in other, less stirring, words, as an account of changes in the distribution of power. In this book, by contrast, we have offered an account of changes in the *nature* of power at Athens, from personal to institutional, from informal to formal, and from undifferentiated to specialized. In doing so, we have traced the rise of the power of the State, with a particular focus on public finance rather than on the public instruments of coercion which are usually but misleadingly placed at the centre of state-formation. The rise of the State turned out to have been a linear process which continued throughout the archaic age, regardless of whether the regime was republican or monarchical, oligarchic or more democratic. The tyrants in this respect continued on the path set out by Solon, and the democracy continued to develop institutions created by the tyrants.

How Greek communities managed their finances before the time of Solon we glimpse in the Homeric epics. Here, no formal system of public finance exists. The ruler has an estate, notionally granted by the community, from which he funds regular expenses, but otherwise we find only *ad hoc* transactions in the form of 'gifts' to and from the ruler and the other 'lords'. No distinct financial institutions or institutionalized levies are attested, though the poet hints that the common people may be coerced into making 'gifts', and lords come under moral pressure to spend on feasts. A pervasive concept in the epics is that responsibility for such financial transactions lies with

the community as a whole, rather than the rulers alone. When a 'lord' distributes land or spoils, he does so on behalf of the people at large; the community as a whole imposes fines and confiscates property, even if in practice it is the ruler who makes the arrangements. The Homeric world thus has an informal system of 'communal', as opposed to 'public', finance and this covers the major areas of its classical successor: warfare, cult and public hospitality. In economic terms, the system is most like the 'domain' State of the Middle Ages. Most transactions are in kind, but some are in the form of weighed metal, and the value of any gift or payment can be measured by the universal standard of the 'oxen-worth'. This epic picture is no doubt selective and idealized, but it is likely that the basic principles of informality, reciprocity and communality did indeed govern the finances of Greek cities around 700 BC. The contrast with public finance in the laws of Solon suggests that the seventh century saw major developments in state formation.

By Solon's time, Athens had a central public treasury, managed by the so-called Ham-Collectors, who probably formed a board of eight officials with a uniquely short one-month term of office. They were assisted by a board of Sellers, who at this time perhaps dealt only with confiscated property. In total, more than 100 men were thus involved at this highest level of public finance every year. Below them were the men responsible for each of the districts called Captaincies, which were not 'organic' residential communities like the later demes, but artificial clusters of settlements in the manner of Cleisthenes' later *trittyes*. The role of these Captains was above all naval and military, but they also collected direct taxes and rents on public property in their districts, which they paid into the central treasury. Military and ritual expenses were reimbursed to them from this treasury, which included an earmarked 'fund for the Captains' (*ta naukrarika*). The insistence on centralization at the expense of practical convenience is notable, as indeed is the very existence of such institutionalized units of military and financial administration across Attica. Temple treasuries and estates were also under central, secular control, rather than in the hands of priests, with a board of eight Treasurers managing the wealth dedicated to Athena on the

Acropolis and one of the chief magistrates, the *basileus*, probably in charge of leasing out sacred estates.

The division of Attica into Captaincies and the existence of a 'fund for the Captains' implies that naval warfare, and warfare at large, was a primary concern of administrative and financial organization under Solon, and indeed even earlier if the tradition about the part played by the 'chiefs of the Captains' in the massacre of Cylon's men in the 630s can be trusted. It is likely that the Captains still operated in the Homeric manner, providing their own ships in time of war and supplying their crews with food and drink, supplemented by whatever plunder they took and shared out. What set Solon's system apart from the Homeric world, however, was its formalization, and the provision of a central fund, the *naukrarika*, from which any costs not recouped from booty would be reimbursed. The cost of cult was similarly reimbursed by the treasury, to a fixed amount in silver stipulated in the ritual calendar for each of the sacrifices held across Attica: again, centralization and formalization were key features of Solon's system. Striking use of public funds was made to advance other collective interests: bounties were offered to those who killed wolves, presumably to make the country safer for agriculture and pasturage, and money was invested in the representation of Athens abroad, in the form of large rewards for victorious athletes in Panhellenic games and an apparently blank-cheque guarantee to cover the expenditures of Athenian envoys to Delphi.

The financial and military contributions of the community were no longer a matter of 'gifts' and 'favours' to leading men, but of legal obligations imposed on formally defined property classes, which probably included at most the richest 15 per cent of citizens. As well as being liable to hoplite service, they paid occasional *eisphora* taxes, a small proportion of annual agricultural produce. Many will have paid the *eisphora* in kind, but a conversion rate of grain into silver was fixed, as part of a revision of measures which included replacing the Homeric 'oxen-worth' with silver weights as the more precise measure of value for public payments of all kinds. Other cities, too, adopted the Euboic silver weight standard as their new measure of value at around this time, but Solon introduced a distinctively Attic subdivision into 100 drachmas.

In short, although Athens under Solon still relied substantially on the use of private resources and established only limited differentiation of functions, financial powers were assigned to institutions rather than individuals, and obligations were not moral and personal but imposed by law and owed to the collective. This degree of institutionalization, formalization and centralization of personnel, procedures and media warrants calling the Solonian administrative apparatus a 'State' and speaking of a system of 'public' finance. Although it is impossible to quantify, the institutionalization of taxes is likely to have increased income from this source while the revenue from leasing out public land was presumably smaller than the revenue which kings had derived from direct exploitation of royal estates, so that there may have been a shift away from 'domain State' towards 'tax State'.

Peisistratus and his sons are said not to have tampered with Athens' institutions, so we have no reason to imagine that the temporary reversion to monarchy entailed a return to more personal forms of government. Expenditures grew as a result of more public building and more intensive overseas warfare, as well as the introduction of standing forces, including a hoplite 'guard' and a unit of archers. Under Hippias, Athens is likely to have acquired triremes – the city's first publicly-owned warships – in response to the widespread adoption of this costly type of ship in the wake of Persian navy-building in the early 520s. In his last few years he was forced to spend lavishly on allies, mercenaries and the fortification of Mounychia. Literary evidence suggests that from Peisistratus onwards standing forces received wages, rather than being rewarded with gifts or land. This tradition is indirectly supported by the introduction of coinage at Athens at this time, presumably not least to facilitate the payment of soldiers, and by epigraphic evidence which shows that contractually agreed wages for public service had become well-established by the late sixth century. Before the end of the century, as an inscription from Eretria shows, wages were paid to expeditionary forces as well, a development which may have been linked with the introduction of the trireme. The ongoing monetization of public finance was reflected in the minting during the final years of Hippias' reign of large quantities of a new coin type, the Owl, which became the template for all later Athenian coinage. Perhaps at about the same

time, older weight standards were abandoned in favour of the silver weight system.

Public wages not only increased spending but also implied a fundamental conceptual change: instead of participants in a communal venture sharing benefits and burdens, citizens became uniformly paid employees of the State which covered costs and collected profits. The minting of coins also implied an extension of the authority of the State, beyond its role in upholding weight standards, by giving it the power to control what was deemed a valid means of payment, at least in the public sphere. It may not be a coincidence that these conceptual developments occurred in a period of monarchy, when the personal power of the ruler perhaps made it easier to establish radically new conceptions and institutions. But it must be stressed again that the new financial powers of government were not merely personal and did not disappear with the monarchy: they became an integral part of the functioning of the Athenian state.

To meet rising expenditure, new revenues were found. The already established *eisphora* tax was levied frequently, perhaps even annually, and set at 5 per cent of agricultural income for the three highest property classes. The use of silver from Laurion in coins of Hippias' last few years shows that the mines were beginning to be more intensively exploited – to the benefit of the treasury, because we cannot infer from the proposed distribution of silver surplus in 483 BC that sharing out mining revenue had been normal practice before this time. The leasing out of mines may indeed have been centralized by assigning responsibility to the board of Sellers rather than to the Captain(s) of the district. Hippias also harnessed private spending power to public purposes by introducing the principle of the 'liturgy', in the form of the choregy for festival performances and the trierarchy (alongside the Captaincy) for naval service, as well as the otherwise unknown phylarchy, which may have paid for cavalry. The trierarchy made it possible for wealthy men without their own ships to share the Captains' leading role in naval warfare for the first time. Finally, Hippias introduced a tax on any part of a private house protruding into public space, and although this will in itself have been a minor source of revenue, its creation implies that by this time every possible source of

tax revenue was exploited. Athens will therefore already have levied the indirect taxes on import, export and local sales which are not explicitly attested until the late fifth century, but known from other parts of archaic Greece. They were presumably collected, as they were later, through tax-farming contracts let out by the Sellers. The range of revenues recorded and implied suggests that Athens under the tyrants became a fully-fledged 'tax State'.

Major restructuring of public finance was undertaken as part of the programme of reform started by Cleisthenes in 508. Apart from slightly increasing the numbers of Ham-Collectors, Sellers and Treasures of Athena to fit the new administrative division into ten tribes, Cleisthenes established a new board of Receivers to handle part of what used to be the Ham-Collectors' responsibilities. More importantly, he transformed the lower levels of financial administration. The 48 Captains lost their tax-collecting duties to local officials, the demarchs, while their remaining responsibility for public leases went to the Sellers. They also lost their military roles to a new hierarchy of *strategoi*, *taxiarchoi* and *lochagoi*, and their naval commands to liturgical trierarchs, who now captained a navy which consisted entirely of publicly-owned triremes. These changes amounted to a great increase in manpower engaged in *eisphora*-collection – there were almost three times as many demarchs as there were Captains – and in a much higher degree of differentiation, with the separation of military and financial functions. The system was also more democratic insofar as the new offices were filled by election or lottery, whereas the position of Captain had probably been filled by whoever owned the best raiding ship in the district.

The creation of a public fleet of 50 triremes, requiring crews of up to 10,000 men, increased public spending exponentially. The building and maintenance of the ships was funded by 50 groups of tax-payers, still known as 'Captaincies', until the Council committee of *trieropoioi* eventually took over this responsibility, perhaps in 481/0. The wages of crews were presumably paid, as they were later, by the public treasury, supplemented from the private resources of the trierarchs.

The *eisphora* was reformed, under Cleisthenes or soon afterwards, from a levy on agricultural produce to a property tax paid in silver.

What is more, the burden of this tax was redistributed so as to weigh much more heavily on the two highest property classes and require only token contributions from the *zeugitai*. In both respects, this reform took long strides towards the *eisphora*-system as we know it from fourth-century Athens. The cumulative effect of Hippias' and Cleisthenes' reforms of the last two decades of the sixth century was to establish, in all essentials, the system of public finance which remained in use in classical Athens.

The main developments of the early fifth century were quantitative rather than qualitative: expenditure on temples, fortifications and other public building grew, as did the scale and cost of festivals and sacrifices and the cost of the navy, which more than doubled in 483 BC. Rising costs might have led to further significant reforms of public finance, had they not been offset by major new revenues: the 'tribute', plunder and other external income which Athens derived from its leadership of the Delian League. These imperial revenues were so large that they could absorb even new forms of public spending when these were introduced in the 450s. Only when surpluses eventually ran out, early in the Peloponnesian War, did the development of Athenian public finance resume its course.

From about 500 BC onwards, then, Athens had a system of public finance which was not merely formalized, but differentiated and rationalized to a high degree. It was fully monetized and relied on revenues from taxation, direct and almost certainly also indirect, as well as from rents for public land and mines. The volume of public financial business at the time was clearly not yet anywhere near the average 1,500 talents per year spent by the city treasurer in 336–324 BC (above, p.1). At the height of the Athenian empire, in 431 BC, the city still generated only about 400 talents from direct and indirect taxes and public assets, as opposed to imperial revenue.[1] All the main mechanisms by which these non-imperial revenues were raised were already in place by the final years of Hippias' reign, as we have seen. The output of Owl coinage suggests that the production of the Laurion silver mines was as high from 512 BC onwards as it was on average throughout the fifth century. On the other hand, the population of Athens in Hippias' day was probably only half as

large as it was in 431 BC, and the volume of taxable trade proportionately smaller. Hippias' revenues will thus not have exceeded 200 talents. But they can hardly have been less than 100 talents, since he spent 40 talents p.a. on the maintenance of a standing force of about 1,000 men alone and incurred a wide range of other military and cultic expenses.

Revenues of 100–200 talents (2.6–5.2 tonnes) of silver are comparable to those of the richest cities and poorest kingdoms of fifteenth-century Europe: Nuremburg spent up to 2.7 tonnes, Austria 4.5, the Holy Roman Empire 5, and Venice 6–12 tonnes p.a. In relative terms, Athens did even better: with a population unlikely to have been larger than 200,000, its revenues amounted to 12.5–25 grammes per head, while for example the revenues of the king of England in the fifteenth century peaked at 44 tonnes of silver for a population of some five million, just over 8 grammes per head.[2]

One easily identifiable cause of these remarkable developments was an external factor: the threat posed to Athens and other Greek states by the vastly greater resources of their expansionist neighbours: first the Lydian kingdom and later the Persian empire. Whether they attacked Greek cities directly or indirectly, by funding wars between cities or civil wars within cities,[3] their intended victims came under intense pressure to try to match the resources at the disposal of their opponents by developing their own institutions of public finance. Persian naval expansion and the attendant spread of the 200-man trireme in the 520s was a particularly powerful force for change, since it caused a huge increase in the cost of naval warfare and thus accelerated the development of public finance in Athens and elsewhere in Greece.

This explanation is, I would argue, an improvement over the traditional view that the transformation of the Athenian state was down to good fortune in mining and the foresight of Themistocles, but it is still much too simple. If the Persians and their triremes had arrived in Greece two centuries earlier, the 'Homeric' communal and informal systems of finance which prevailed then would surely not have been able to keep pace with international naval developments. It is only because Athens and other city-states had by the 520s already developed a complex apparatus of government that they were able to adapt to

military change and raise their financial and political institutions to the next level of efficiency and sophistication.

In the earlier development of these institutions, naval warfare among Greek states must have played a large part. As early as 600 BC, Athens' wars against what were then major Greek powers – Megara, Mytilene and probably also Aegina – surely help explain the prominent role of the Captains and the Captains' Fund in the financial and military administration of the city under Solon. It is worth remembering that even in 491 and 483 BC, the Athenian fleet was expanded to wage war against Aegina rather than Persia. But Athenian government also played judicial, cultic and other roles, which on a day-to-day basis were arguably more important, if less costly, than warfare. Here, too, we see growing institutionalization and formalization of power and responsibility, yet the fixing of fines and rewards or the limiting of ritual expenditure were hardly the result of efforts to maximize the city's military potential.

Warfare thus accelerated the rise of the State and public finance but there was a more general development towards the institutionalization of power. The main feature of institutional power is not so much that it is more efficient than personal power as that it creates greater stability. A community which relies on personal influence and initiative for its organization can be highly effective under a charismatic leader but is always at risk of experiencing an occasional vacuum of authority and leadership or falling prey to an accumulation of too much informal power in the hands of private individuals. The latter was at least as much of a concern to Athens and other archaic Greek communities as the former. The extreme division of power between perhaps as many as 96 'Ham-collectors' every year illustrates the fear of excessive power in public finance, which is also evident in many other Greek political and judicial institutions which enshrined the sharing and restriction of power. Archaic Greek communities were in general deeply divided by rivalries for wealth and honour among the elite, as well as by antagonism between the leisured elite and the working classes,[4] and what shaped the archaic Athenian state and its finances was the need to create internal relations of power sufficiently stable to hold the community together and to enable it to compete successfully against other communities.

Something similar might well be true also of state-formation in other periods and places, but Athens' development differed in two fundamental ways from the medieval and early modern European states against which it is usually measured. First, the central monopoly of legitimate force which European monarchies took centuries to establish at the expense of feudal lords and town militias was in Athens already in existence before Solon. Central *means* of coercion remained limited – though between the Eleven, the other magistrates and their attendants, the prison guards and eventually the corps of Scythian archers, they were not negligible – but the scope for self-help, which remained quite large, was formally and precisely defined already in Draco's homicide law of *c.* 620 BC. The *principle* that the private use of force was subject to the sanction of central, communal authority was clear and uncontested.

Secondly, a struggle for the power to raise direct taxes, which was the other major aspect of the centralizing efforts of European monarchs, barely featured in Athenian history. There was certainly reluctance to pay such taxes but the right of the authorities to levy them when necessary was uncontested, and already enshrined in Solon's system of property classes, as we have argued. What is more, instead of taxing the common man to pay for the military expenses of the elite, the Athenian principle was that the highest property classes, the wealthiest 15 per cent, should provide both the manpower and the money required for military, cultic and other communal activity, while the less well-off should be paid for their services if these were required, as they were in naval warfare. As a result, Athens in effect had a system of taxation which was 'progressive' from the start, and which inherently entailed a significant redistribution of wealth through public payment, at first in kind and later in cash.

With the reform of the *eisphora* which we have attributed to Cleisthenes an even steeper rate of progression was introduced as the bulk of the tax burden was transferred to the two highest property classes, while the creation of an all-trireme navy which we have also attributed to Cleisthenes vastly increased the scale of payments to poorer citizens. Arguably, this was a greater contribution to the rise of democracy than any of his better-known reforms. It also paved

the way for the subsequent introduction of pay for the performance of political and religious civic duties, which turned Athens into a 'radical' democracy – and which, in terms of public finance, initiated the redistribution of wealth through public finance on a scale not seen again until the rise of the modern 'fiscal State' in Europe.

Appendix

Persian Naval Expansion and the Ionian Cities

The building and maintenance of triremes at the behest of the Persians after 530 BC, we have argued (Ch. 2, pp.33–4), had a significant impact on the development of the state in the Greek cities of Ionia and the rest of Anatolia; more importantly, the Ionian cities quickly began to use their new triremes against other Greeks who were thus forced to develop public trireme navies of their own. Our most explicit source on the organization of Ionian navies, however, says that in the Persian fleet of 480 BC 'the Greeks provided the crews while the king supplied the vessels' (Diod. 11.3.7). If so, the Ionians could clearly not have deployed these Persian-owned triremes in their wars against other Greeks, and there would have been little pressure on mainland Greeks to build triremes until about 500 BC, when a Persian fleet first crossed the Aegean in a direct (failed) attack on Naxos.

There is in fact sufficient evidence to show that the arrangement described by Diodorus did not yet exist in the sixth century, when Persia apparently merely paid for trireme-construction by its Greek subjects. The first known reference to a trireme in Greek literature (Hipponax fr. 28 West, c. 540–500 BC) alludes to a painter decorating a trireme, which is evidently being *built* in Ephesus or a nearby Ionian city. Similarly, only if the Greek cities had their own triremes could one say, as Herodotus does, that the Persians 'took ships from the Lesbians' for the conquest of Lemnos (5.26). Above all, only if the Ionians had control over their own triremes could they have managed to deploy more than 350 vessels in their revolt.[1]

The story of Polycrates also best fits a scenario in which Persians funded the Ionians but did not directly control their triremes. We are never told how Polycrates acquired his 40 triremes, only that he sent them

to join the Persian fleet, and that after their desertion he travelled – in a penteconter – to the nearest Persian satrap in search of funds to support his naval ambitions, but ended up being executed. Herodotus attributed Polycrates' execution by crucifixion – normally a public punishment – to petty personal status rivalries (3.120–5), and he adopted the point of view of the deserting captains of the 40 triremes, who will have justified their actions by claiming that Polycrates had secretly volunteered to send ships manned with his enemies, so that they would be destroyed (3.44–5.1). But stripped of folk-tale motifs and political bias, the bare bones of the story suggest a simpler explanation: Polycrates built his triremes with Persian funds in return for providing naval service, and later applied for more funds only to be punished for having failed to ensure that the promised ships materialized for the campaign against Egypt. A clear indication that the 40 triremes were indeed built in Samos itself is that their foreparts were in the shape of boar's heads (Hdt. 3.58.3), which was also characteristic of the Samian version of the penteconter, the *samaina*.[2]

If Diodorus and his source were right about the organization of the Ionian fleet in 480 – and there is no reason to think that they were wrong – the arrangements had changed radically from what they had been in the late sixth century. It is not hard to see why: once the Ionians had used their relative independence to mount a major revolt, the Persians had every reason to impose tighter control. It was only when they reorganized the administration of the region in 493, after putting down the revolt with great difficulty, that the Persians first deprived the Ionian cities of the freedom to wage war against one another (Hdt. 6.42–3). In that context, the Persians in all likelihood also finally took direct control over the triremes which for about a generation the Ionians had been able to use freely in waging such wars.[3]

Notes

Chapter 1

1 Survey of early modern European public spending: Körner 1995: 398-401 (with some population figures in Bonney 1995: 317). Lycurgus' expenditures: Plut. *Mor.* 841bc, and 852b, citing the decree of Stratocles of 307/6 BC (cf. *IG* II² 457); Humphreys 2004: 77–129; population: census figures of 317 BC indicate a free population of *c.* 125,000 (Ctesicles *FGrH* 245 F 1; Athen. 272c), which we may double (at most) to include slaves; cf. van Wees 2011a.

2 See below, Ch. 4 (wages), 5 (taxes). Xen. *Ways & Means (Poroi)*, esp. 3.9–10; 4.14–17.

3 For references, see below, nn.6 and 9.

4 New fiscal history: e.g. Tilly 1990; Hoffmann and Norberg (eds) 1994; Bonney (ed.) 1995; 1999; Ormrod, Bonney and Bonney (eds) 1999; cf. the survey in Millett 2010; an important contribution to the field will be Monson and Scheidel (eds), forthcoming.

5 The third edition of Boeckh's work was reprinted in 2010 (CUP); cf. Manning and Morris 2005: 27 ('Boeckh […] has still not been superseded'). Two rare studies which do discuss archaic evidence are Andreades 1933; Ostwald 1995.

6 Later versions: Thuc. 1.14.3, 93.3; *Ath. Pol.* 22.7; Nepos, *Them.* 2.2; Plut., *Them.* 4.4, 19.3–5; discussed below, pp.65–6. Modern accounts which adopt the ancient tradition (sometimes adding a small-scale precedent for Themistocles' programme in 491 – see below, pp.65): e.g. Kahrstedt 1934: esp. 247; Latte 1946/7 (1968): 311–12; Labarbe 1957; Amit 1965: 18–20, 103–6; Haas 1985; Ostwald 1995: 372; Morrison et al. 2000: 53; Wallinga 2005: 7–11; 2000: 136–40; 1993: 140–57; Kurke 2002: 95–6; Gabrielsen 2007: 254–55; 1994: 26–37; Möller 2007: 376; Pritchard 2010: 10, 16; cf. Herman 2006: 39; Hale 2009: 8–20, esp. 12,

15; Trundle 2010a: 236. Somewhat more critical of ancient tradition are Jordan 1975: 5–20; van Wees 2004: 202–9; Aperghis 2013.

7 In detail: van Wees 2002a: 337–43. The appeal of this narrative gambit made Herodotus forget that he had earlier credited Athens with having 70 ships even before Themistocles: below, pp.65–6. Irwin 2009; 2011 on the contemporary debates about thalassocracy reflected in Herodotus' work.

8 Thucydides: Hornblower 1991: 3–51; Kallet-Marx 1993. Later sources: Ceccarelli 1993; van Wees 1995a: 155–62. Quotation: Plut. *Them*. 4.4. See below, pp.55–6.

9 This is in some respects close to the view which prevailed before Kahrstedt (see n.6): e.g. Boeckh 1886: 323; Beloch 1913: 321–7; Busolt 1920: 599–600.

10 Contra Schubert 2008, who argues that not even Themistocles' ship building brought about these structural changes, which she dates to 427 BC below, p.92 n.36.

11 'daß der moderne Staat ein anstaltsmäßiger Herrschaftsverband ist, der innerhalb eines Gebietes die legitime physische Gewaltsamkeit zu monopolisieren mit Erfolg getrachtet hat und zu diesem Zweck die sachlichen Betriebsmittel in der Hand seiner Leiter vereinigt […]' (Weber 1976: 824; originally published in *Politik als Beruf* in 1919).

12 E.g. Gellner 1983: 4 (Berent 2000: 260): 'the State exists where specialized order-enforcing agencies, such as police forces and courts, have separated out from the rest of social life'; Tilly 1990: 1, 130: 'concentrated means of coercion'; Fried 1967: 230–1.

13 For the label, see Berent 2000: 258; for limited central coercive power in Greek city-states, see also e.g. Finley 1983: 18–20; Osborne 1985: 7; Herman 2006: 216–57. Hansen 2002: 32–9, compares Athens and early modern countries; cf. Faraguna 2000.

14 'daß man allen anderen Verbänden oder Einzelpersonen das Recht zur physischen Gewaltsamkeit nur soweit zuschreibt, als der Staat sie von ihrer Seite zuläßt: er gilt als alleinige Quelle des "Rechts" auf Gewaltsamkeit' (Weber 1976: 822).

15 Weber 1976: 822 (the State exercises power by legitimate use of force, 'ebenso wie die ihm geschichtlich vorausgehenden politische Verbände').

16 Weber 1976: 122–48, 541–688, 822–3.

17 E.g. Service 1975: 14 (state based on 'the institutionalization of the power to govern'), 71–2; cf. Yoffee 2005: 16 (state is a central authority 'differentiated' from other social structures).

18 See esp. the analysis of Tilly 1990: 29 (from AD 1700), 96–126.

19 Cohen 2000: esp. 13, pointing out that the territory and population of classical Athens were about the same size as modern Luxembourg's. Acharnae: its 22 representatives on the Council of 500 suggest that the town contained 4.4 per cent of the total population of 250,000–400,000 (an even larger population in Acharnae is suggested by Thuc. 2.13.6 with 20.4, but see Hornblower 1991: 273–4). Late unification: esp. Anderson 2003; Pritchard 2005: 137–40.

20 Berent 2000: 260–62; Hunter 1994: 145–9; Finley 1983: 18.

21 So esp. Frost 1984 (army); Haas 1985; Gabrielsen 1985; 1994: 19–24 (navy); more recently e.g. Pritchard 2010: 8–19. See further below, p.44 n.22; pp.56–60 nn.60–7.

22 Esp. Hasebroek 1933; Finley 1973: 150–76; cf. recently Möller 2007: 375–80.

23 See e.g. Morley 2007: 70–3; Migeotte 2009: 143–70; Bissa 2009.

24 Contra e.g. Möller 2007: 377 ('most Greeks viewed direct taxation as tyrannical'); Boeckh 1886: 1.366–7, both citing Demosthenes 22.54–5, who in fact does not denounce the property tax as such but the way Androtion enforces its levy by means of imprisonment.

25 See Scheidel et al. (eds) 2007; Scheidel and Von Reden (eds) 2002; Bresson 2000, for challenges to the 'primitivist' approach defined above all by Finley 1973.

26 Plut. *Sol.* 24.1 (F 65 R). Both the precise attribution ('in the first *axon*') and the archaic punishment prescribed (a curse) show that this is a genuine Solonian law.

27 See van Wees 2009: 463; Stanley 1999: 155–7, 229–34; Garnsey 1988: 8–26, 109–11.

28 Grain: e.g. Moreno 2007; Bissa 2009: 169–91. Pottery: esp. Osborne 1996. For recent surveys of the Greek economy, see Osborne 2007; van Wees 2009 (archaic); Davies 2007; Oliver 2006 (classical); Reger 2003; 2007 (hellenistic).

29 Athenian state as employer: Ch. 5; employment in dockyards: Jordan 1975: 21–61; cf. Gabrielsen 1994: 133; cf. Hocquet 1999: 384–5 (Venice, *c.* 1550–1600); Bruijn 2000: esp. 87 (France, *c.* 1650 onwards).

30 For the typology, see esp. Ormrod, Bonney and Bonney (eds) 1999: viii, 4–8 (tables 0.1, 0.2).

31 The term 'tribute State' is coined by Bonney and Ormrod (above, n.30) to describe the Roman and Carolingian empires, but they do not suggest that the tribute State represents an earlier stage of development than the (medieval) 'domain State'.

32 See e.g. O'Brien and Hunt 1999: 60–1, on the impact of indirect taxes on the early modern English state. Medieval city-states: e.g. Hocquet 1995.

33 Borrowing: e.g. Hocquet 1995: 87–93; 1999: 384–5 (in 1783, 55.8 per cent of Venice's public expenditure was on debt servicing). Permanent public debt: Tilly 1990: esp. 29, 74–5.

34 Typology of 'fiscal State': Bonney and Ormrod (above n.30); in addition to distinct economic features, different types of 'fiscal constitution' also have different degrees of institutionalization and complexity, as outlined above.

35 For the fifth century: see e.g. Hansen and Nielsen 2004: 624–7. The sixth-century figure is based on the assumption that the citizen population could not have been much lower than 20,000 in *c.* 600, if it was *c.* 30,000 in *c.* 500 and *c.* 60,000 in 431 BC.

Chapter 2

1 See van Wees 2002b and forthcoming, for composition of the epics *c.* 700–650 BC. Earlier studies of Homeric public finance: Moreaux 1895; Andreades 1915; 1933: 3–29.

2 *Od.* 7.191–4, 226–7; 'lords': 7.48–50; 'leaders': 7.98–9.

3 The extended group are described as 'leaders and councillors' (*Od.* 8.10–11, 26) and 'lords' (8.40–1, 46–7): the meeting does not constitute a popular assembly.

4 *Od.* 6.264–5: πᾶσιν γὰρ ἐπίστιόν ἐστιν ἑκάστῳ; cf. the ships used by Paris, which are built especially for him, not part of a Trojan navy: *Il.* 5.59–64.

5 *Od.* 13.69, 72: these must be supplies for the crew, not for Odysseus, who will be asleep throughout the (night-time) journey.

6 A man may make a public appeal to be given a ship and crew even for a private mission, as Telemachus does during a session of the popular assembly; like Alcinous, he addresses his request to the leading men (*Od.* 2.209–12; cf. 306–7), who have their own ship(s) (4.669–74, 778–86), rather than to the assembly at large (1.372–3; 2.25).

7 *Od.* 14.248–51 (Cretan); 2.288–91, 337–415 (Telemachus).

8 At a standard daily ration of 1 *choinix* of barley flour and 1 *kotyle* of wine, Odysseus' 12 x 52 men would have consumed 156 *medimnoi* of barley and 52 *metretai* of wine in 12 days: cf. the annual income of 500 *medimnoi* of Athens' highest property class.

9 At Troy, awards of spoils are made by Agamemnon (e.g. *Il.* 9.334, 367–8), but at the same time seen as given by 'the Greeks' collectively (1.162, 276, 299, 366–9, 392; 2.226–8; 16.56; 18.444); see further van Wees 1992: 299–310.

10 See further van Wees 1995b: 165–6; Carlier 1984: 155–6.

11 The geography of the *Iliad* has no Greeks living in Thrace; it seems that the poet briefly forgets heroic geography and reveals conditions in his own day.

12 See van Wees 2008: 20–1. The legal fees mentioned at *Il.* 18.502–7 are not public revenue, but awarded to an individual judge.

13 Bellerophon is given a *temenos* by the Lycians (*Il.* 6.191–5); his grandson Sarpedon states that this 'great estate' obliges him to be an outstanding warrior among the Lycians (12.310–21). Other references to *temenea* held by rulers do not say that these were publicly awarded (*Il.* 18.550–60; 20.391; *Od.* 6.291–4; 11.184–5; 17.279), but there are other references to communities awarding estates to outstanding private individuals (*Il.* 9.574–80; 20.185–6). See further van Wees 1992: 294–8; Donlan 1989: 129–33; Carlier 1984: 158–60; Finley 1978: 95; but *contra* Finley 1981: 225–6.

14 *Il.* 24.253–62; on this passage and other evidence for use of force and intimidation: van Wees 1999: esp. 5–7, 30–2. On the principles of reciprocity: van Wees 1998a.

15 *Misthos* for labour: *Il.* 21.444–5; *Od.* 18.358; Hesiod, *W&D* 370; van Wees 2010: 210–11. Reciprocal v. contractual relations: van Wees 1998a: 15–20.

16 Onasilos: *Nomima* no. 31 (*ICS* 217); grant made by 'king and city': lines 2, 4, 6, 14–16; cf. n.13, above, for Homeric grants. Democedes: Hdt. 3.131.2.

17 *Nomima* no. 25 (Eleutherna; *IC* II.12.9) and no. 28 (Axos; *IC* II.5.1), 2–3, 8, 14–15 (*ateleia* and *tropa* in *andreion*), 6–7 (five days' unpaid work), 11 (*misthos*). The restoration μισθὸ[ν] for 'barely legible traces' of ισο or ισον in *Nomima* no. 27 (*BCH* 70 [1946]: 600–6), Dreros, *c.* 575 BC, is surely too adventurous.

18 *Nomima* no. 22 (*LSAG* 468.14b); Jeffery and Morpurgo-Davies 1970.

19 Delphi: *Nomima* no. 72 (*BCH* 49 [1925]: 25–30). Whitened boards are mentioned in the Themistocles decree of 480 BC, which I believe to be genuine: ML 23.28–9.

20 *I.Ephesos* 1a.1; *SGDI* IV.4, no. 49. My knowledge of Kroll's important new study derives from a lecture he delivered at Oxford on 14 May 2012.

21 Hdt. 9.33.3–4. Cf. 5.45.2: land granted to seer Callias of Elis in 510 BC for his services in war; 9.38.1: seer Hegesistratus 'hired for no small sum' by Mardonius.

22 See esp. Hdt. 2.152–4; ML 7; *SEG* 37.994; further Bettalli 1995: 43–111; Luraghi 2006. Sullivan 2011 dismisses the distinction between reciprocal and contractual service.

23 Terminology: Trundle 2004: 10–24; van Wees 2004: 71–3; Lavelle 1997.

24 Polycrates and Sicilian tyrants: Hdt. 3.125.2; hired troops: Hdt. 3.45.3 (Samos); Diod. 11.72.3 (Gelo grants citizenship to 'more than 10,000 foreign hired soldiers'); 11.48.3, 53.3, 67.5–7 (hired soldiers in Syracuse and Acragas, 470s).

25 Hdt. 7.154.1: one of his spear-bearers is Gelon, whose family traced its descent to one of the original settlers of Gela (7.153); cf. Luraghi 1994: 177; Bettalli 1995: 92–3. Periander: Nic. Dam. *FGrH* 90 F 58 (300 men); Ephorus *FGrH* 70 F 179 (first body-guard). Aristotle's contradictory claim elsewhere that 'the guards of tyrants are foreigners' (*Pol.* 1311a8–9) is presumably based mainly on tyrants of the classical age.

26 *IG* XII.9, 1273.1274 [*SEG* 41.725], 10–12. Full discussion: van Wees 2010, building on Cairns 1991: 310–13; cf. Gabrielsen 2007: 257; Burrer 2008: 76; *contra* e.g. Ziebarth 1929: 123; Pritchett 1991: 379 n.541; Walker 2004: 192–6.

27 *Nomima* no. 14 (*LSAG* 314.27; *IC* II.12.11), Eleutherna, late sixth century: 'If someone sails as a sacred envoy' (θιαρὸς); for another example, see below, pp.41–2.

28 The ferry regulation imposed on Euboea by Athens (*IG* I^3 41), cited by Ziebarth 1929: 123, as a parallel, does stipulate all these details; see van Wees 2010: 208–9.

29 This is a logical consequence of introducing a tax to pay for wages, and also how classical Athenian naval pay functioned. Soldiers might still be paid with money raised by *ad hoc* sale of booty in the event of a shortage or late arrival of central funds, but such emergency short-cuts did not change the principle.

30 *Prytaneion: Nomima* no. 32 (n.31, below). Maintenance: no. 22 (n.18, above), lines A2, B11; no. 28 (n.17, above), 13–14. *Xenia*: no. 54.II (n.32, below), 35–42.

31 *Nomima* no. 32 (*LSAG* 367.51); cf. Francotte 1909: 61. The text is from the first century BC, but traces show that it was a reinscribed sixth-century document.

32 Axos: *Nomima* no. 28 (*LSAG* 314–16.2; *IC* II.5.1). Knossos: *Nomima* no. 54.II; ML 42 (*IC* I.8.4, 13–14). Idalion: *Nomima* no. 31 (n.16 above). *Ateleia*: also *Nomima* no. 8 (*IC* IV.64), Gortyn, early fifth century; no. 18 (*SEG* IV.27), Casmenai, 484/3; no. 22 (*LSAG* 468.14b), Arkades, *c.* 500 (Spensithios contract: see above).

33 Naupactus*: Nomima* no. 43; ML 20 (*IG* IX.1^2 3.718); cf. Graham 1964: 47–8. Thessaly: *Nomima* no. 33 (*IG* IX.2.257): '*ateleia* […] both when there is a

tagos and when there is no *tagos*'; the *tagos* was probably entitled to raise special levies of troops and tribute since the sixth century: Xen. *Hell*. 6.1.9, 12, 19; van Wees 2003: 56–7.

34 *Nomima* no. 74 (*LSAG* 405.8; *SEG* XI.244).

35 Aristotle F 611.20 Rose = Heracleides *FHG* ii F 5. There may be an implicit contrast with his father Cypselus, who allegedly levied a tithe on property (not income) to fund his extravagant dedications to Zeus ([Arist.] *Oec*. 1346a31–46b5). This level of taxation could hardly be sustained and the story is surely fictional, but behind it may lie a tithe on crops.

36 Salmon 1984: 132–9, on *diolkos* and taxes. The building of a 'bazaar' by Polycrates of Samos (Clearchus fr. 44 Wehrli) may also have served to increased revenue from trade (Shipley 1987: 76, 82–3).

37 Early evidence of a fine (*thoe*, as in Homer): *Nomima* no. 1 (*IC* IV.13), line 2m, Gortyn, late seventh century. Half of fine paid 'to the polis': *Nomima* no. 16 (*IC* IV.78), 7–8, Gortyn, early fifth century; see below, p.42 for Athenian parallels. Early fine in weight of metal: *Nomima* no. 62; ML 8 (*LSAG* 336.41), Chios, *c.* 550; 'a cow': no. 109 (*LSAG* 408.5; *IvO* 7), Olympia, late sixth century; '30 *medimnoi*': no. 78 (*LSAG* 43; *SEG* XXX.380), Tiryns, early sixth century. For 'axes', 'cauldrons', etc., see below, Ch. 6.

38 'Making property public': *Nomima* no. 44 (*LSAG* 105; *IG* IX.I^2 3.609), line 12, Locris/Aetolia, *c.* 525–500: χρεματα δὲ δαμευόσθον; cf. no. 105 (*Chiron* 1981: 1–30), A.14–15, Teos, *c.* 470; no. 107 (*IG* IV.554), 5, Argos/Halieis, *c.* 480–470. Tyrants: e.g. Hdt. 5.92.η (Cypselus). Selling off property: *Nomima* no. 19 (*GIBM* IV.886), 35–40, Halicarnassus, 475–450 BC; [Arist.] *Oec*. 1346b6–13; cf. below, pp.42–3, for Athens.

39 *Nomima* no. 44 (*LSAG* 105; *IG* IX.I^2 3.609); cf. no. 8 (*IC* IV.64), Gortyn, early fifth century; no. 21 (*IvO* 11), Olympia, 500–475 BC.

40 Weights, measures, coins: see Ch. 6, below. For the adoption of alphabetic writing from Phoenician models, *c.* 800 BC, see e.g. the survey in Wilson 2009.

41 e.g. Hdt. 1.50–2, 92; 2.180, 182; 3.47 (dedications); Hdt. 1.54; 1.69.4; 5.125 (gifts of gold); Alcaeus fr. 69 L-P (see below, Ch. 7 n.3).

42 Hom. *Il*. 20.247 (ἑκατόζυγος); cf. 2.509–10 (crews of 120); two-level galleys: Casson 1995: 53–65, 71–6; Wallinga 1993: 45–63; cf. Bremmer 1990.

43 The very nature of the ship contradicts the notion – presumably derived from the early modern European chartering and converting of merchant ships for military use – that early penteconters were primarily used for trade and only incidentally for war and raiding (Wallinga 1993: 4–6, 17–18,

and Beloch 1913: 322, speak of 'armed merchantmen'; Scott 2005: 467, 469, says their owners were 'usually traders').

44 In Homer, a 'cargo-bearing ship' is an oared galley (*Od.* 9.322–3; with 20 oarsmen). The first sail-powered merchantmen appear in Greek art around 550 BC: Humphreys 1978: 166–9; Gray 1974; contra Reed 1984. The evidence from shipwrecks is hard to use, since usually only (part of) the cargo survives and it is difficult to tell whether the vessel that carried it was Greek, rather than e.g. Phoenician, and whether it was a 'long ship' (penteconter or smaller oared galley) or a 'round' merchant ship: for instance, a cargo of some 100 amphorae (on a seventh-century Cypriot [?] ship: Greene et al. 2010) could easily have been carried by a penteconter. The earliest wreck plausibly identified as a (small) Greek merchant ship dates to *c.* 570–560 BC (Greene et al. 2008); further examples appear only after 550: van Wees 2009.

45 Cf. e.g. Wallinga 1993: 101–2 ('a veritable revolution').

46 So e.g. Pritchard 2010: 9–10; Scott 2000: 93; Wallinga 2000: 137; Gabrielsen 1994: esp. 25–6; 1985: 50; Haas 1985: 40, 45–6; Kahrstedt 1934: 247–8; Beloch 1913: 322. An exception is Wallinga 1993: 19, 45–65, who suggests that penteconters were state-owned ships, forming a small part of navies consisting otherwise of private ships.

47 Hdt. 1.163.1–2, 164.3, 166; Thuc. 1.13.6.

48 For this interpretation see van Wees 2004: 205; contra e.g. Scott 2000: 108; Jackson 2000: 141–7, who argue for a public navy under Polycrates.

49 *Samaina*: Plut. *Per.* 26.3; Hesych. s.v. *Samiakos tropos*; Suda s.v. *Samiôn ho demos*; plausibly interpreted by van Alfen, forthcoming, who however assumes that such ships were built at public expense. Reconstruction drawings in Damianides 2008.

50 Penteconters in Herodotus: Phocaeans: see n.47, above: their defeat of (more numerous) Carthaginian and Etruscan ships (Hdt. 1. 166; Thuc. 1.13.6) implies that the latter did not yet have triremes either, as confirmed by the voyage of exploration by Hanno, in the sixth century or later with 60 penteconters (*Peripl. Hann.* 1; cf. Hoyos 2010: 51–4), and by three Etruscan penteconters joining the Sicilian expedition in 414 (Thuc. 6.103.2); Polycrates: Hdt. 3.39.3, 41.2, 124.2; Sparta, 546 BC: Hdt. 1.152.2; also Thera, late seventh century: Hdt. 4.153, 156.2.

51 Mytilene: 3.13.1; it had a crew of 200: 14.4–5. Polycrates: 3.44.2.

52 Hdt. 4.87.1, 89.1, 97.2, 137–8.

53 Hdt. 5.26 (*c.* 510 BC); 5.33.1, 3; 37.1 (500 BC).

54 Hdt. 6.8; the Lesbians had assigned another eight triremes to Histiaeus: 6.5.2–3.

55 Hdt. 8.1.1 (Artemision: 271 triremes, 9 penteconters), 8.43–8 (Salamis: 366 triremes, 7 penteconters); 7.158.4 (Syracuse: 200 triremes), 7.168, 2, 4 (Corcyra, 60 triremes).

56 The Persians are 'not sea-faring people' and no threat to islanders *c.* 545 BC (Hdt. 1.143.1; 151); after 530, Cambyses takes control of sea (3.34.4); cf. Wallinga 1993: 118; 2005: 11–15. Egypt's naval expansion: Hdt. 2.161.1, 182.2; Lloyd 2000.

57 Unforced surrender of Ionian islanders, and special status of Miletus in 545: Hdt. 1.169; cf. 1.22.4, 141.4, 143.1. Continued *de facto* independence: esp. 3.39 (Polycrates' alliance with Egypt; Samos, Miletus and Lesbos at war with one another). Phoenician and Cypriot naval contingents enjoyed a similar semi-dependent status: Hdt. 3.19. See further Appendix.

58 Hdt. 3.57–9; at 3.59.1: 'receiving [Hydrea] ἀντι χρημάτων' must mean 'instead of money' (Jackson 2000: 144), not 'in exchange for money'. Naval battle: 3.59.3.

59 A point made by Figueira 2011: 191.

60 Hdt. 6.17 (Dionysius of Phocaea to Sicily with three captured triremes, and presumably his original three triremes as well: 6.8.2, 12.3); 6.22–3 (Samians and Milesians – and Coan(s), see Hdt. 7.164 – seize Zancle, creating a threat to the Straits of Messina).

61 See esp. Hdt. 7.154–5, 158 (cf. 5.46), and 165; before the fourth century, all we hear about the Carthaginian navy is that Hamilcar invaded Sicily in 480 with 'more than 2,000 long ships' (Diod. 11.20.2), which is useless. Carthaginian expansion in Sicily: Hoyos 2010: 47–9, 149–66; for the navy, see Rawlings 2010.

62 Corinth may have been the first city in Greece to build triremes, some time before the middle of the sixth century, as Thucydides claimed (1.13.2; a date well before 545 is implied by 1.14.1), perhaps already during the reign of Periander, *c.* 600 BC (Nic. Dam. *FGrH* 90 F 58.3). If so, these triremes were presumably few, or else Samian penteconters could not have defied Corinth for a generation or more (Hdt. 3.48). A much earlier date still is often inferred from the next events mentioned by Thucydides, dated to 704 and 664 BC (e.g. Hornblower 1991: 42–3; Morrison et al. 2000: 36–8), but it seems to me that Thucydides' account of Corinth's pioneering role in Greek naval history runs essentially backwards, from the adoption of 'modern' methods in naval matters and the building of triremes to the first creation of an *emporion* on the isthmus, via the events of 704/664. There is certainly no other evidence for triremes in Greece, or anywhere else, in the late eighth

century. On the origins of the trireme, see e.g. Wallinga 1993: 103–29; Morrison et al. 2000: 25–46.

63 Attack: Hdt. 6.5.3, 26, 28.1; ship-building: 6.46.2.

64 Hdt. 6.89; Thuc. 1.41.2; the buyer was Athens: see below, p.65. The ships sold must have been publicly owned, whatever one's interpretation of the law which banned 'giving away' ships (Hdt. ibid; see Scott 2005: 324–5; 2000: 106–7; van Wees 2004: 205; Wallinga 1993: 26–7).

65 Their implementation probably took at least until 501/0: *Ath. Pol.* 22.2.

Chapter 3

1 For μεγ[άλας ἀρχ]ὰς, see Rhodes 1981: 138–9. I will for convenience call the author of *Ath. Pol.* 'Aristotle', although he probably was not: Rhodes 1981: 58–63.

2 Responsibilities: *IG* I³ 4 (485 BC); Jordan 1979: 19–55. Number: *IG* I³ 510 (*LSAG* 77.21; pl. 3). Further Rhodes 1981: 549–51; Samons 2000: 30–50.

3 A Solonian law (still notionally valid in the fourth century) is cited at *Ath. Pol.* 8.1, 47.1 as evidence for appointment from the highest property class. For the selection procedure, see further Rhodes 1981: 146–8; de Ste Croix 2004: 89–107.

4 Public lending: *IG* I³ 363 (Fornara 113); Samons 2000: 43–8; private lending: *IG* I³ 248 (Fornara 90); removable gold: Thuc. 2.13.5. See Davies 2001.

5 Ephesus: *I. Ephesus* 1a.1, B.6 [ὦ](ν) δ'ἐργα(ζ)ό[μ]εθα, τεσσαράκοντα μνέαι; cf. Davies 2001, 121; Heichelheim 1964: 73–4. Hecataeus' (rejected) proposal to fund the Ionian fleet in 500 BC from the treasures of Apollo (Hdt. 5.36.3, see above, 36) is probably not relevant, since the verb used (καθαιρέω) suggests seizure rather than borrowing. Davies 2001: 125–6, suggests that borrowing from temples was more acceptable to states with large navies due to their 'horrendous costs'.

6 'Secular' is not strictly an accurate translation of ὅσια (Samons 2000: 28–9, 325–9), but is used here to represent the contrast with 'sacred' funds (ἱερά).

7 Overlapping lists at Hdt. 6.56–7; Xen. *Lac. Pol.* 15.3–5. For privileges of priests and magistrates, see van Straten 1995: 145–6, 154–5.

8 Xen. *Lac. Pol.* 4.3; *Nomima* no. 64 (*BCH* 70 [1946]: 590–7 no. 2), from Dreros.

9 The etymological connection of their name with sacrificial shares was already suggested by *Suda* s.v. κωλακρέτης, and accepted by Boeckh 1886: 213–17. Despite the modern use of the term 'Collectors' for certain officials in LBA Mycenae, their title, if any, is unknown, and so far as one can tell their functions were quite different from those of the archaic *kolakretai*: see e.g. Shelmerdine 2008: 132.

10 So also e.g. Lambert 1993: 386–7, who notes the similarity between 'give silver from the *naukrarika*' and the clause 'spend from the naukraric silver' cited from 'laws of Solon which are no longer in use' in *Ath. Pol.* 8.3: below, pp.44–5. Schubert 2008: 43 n.38, wrongly assumes that 'silver' means 'coins' and thus a date after Solon: below, pp.121–3.

11 For details of the *kolakretai* in the classical period, see Rhodes 1981: 139–40, 558.

12 *Ath. Pol.* 44.1: 'the temples in which the city keeps its money and records'.

13 Solonian laws: F 36a–b R (schol. *Il.* 21.282), 65 (Plut. *Sol.* 24.1), citing numbered *axones*; F 32a (Plu. *Sol.* 21.1), very small fines suggesting an archaic date (cf. classical version in F 33b). Inscriptions: *IG* I^3 1.7 (ML 14); *IG* I^3 4.8–9, 26–7 (*Nomima* no. 96).

14 So Harding 1994: 137–8. The *naukrarika* was thus in some respects an archaic precursor for the fourth-century *merismos* of funds among magistrates: see Rhodes 1981: 559–60.

15 Solon fr. 4.12–13 West: 'sparing neither sacred property nor public (τι δημοσίων) they steal left and right with their robbery'. Term of office: see Rhodes 1972: 102.

16 Esp. *Ath. Pol.* 47.2–4; see further Rhodes 1981: 552–7.

17 Sale 'by public authority' of confiscated property in Athens is mentioned for 510 BC (Hdt. 6.121), but confiscation was so common from Homer onwards (above, pp.21–2), that institutional arrangements must have been made even earlier.

18 This is the case with all the financial boards which existed in the fourth century (*Ath. Pol.* 47.1–2; 48.1, 3–4); the pattern surely goes back to Cleisthenes.

19 So Harding 1994: 91–4; cf. Rhodes 1981: 557–8. *Apodektai* are not attested until the late fifth century, but before that time neither *kolakretai* nor any other officials are attested in their 'receiving' role either, so the gap in the evidence is no real obstacle to this interpretation. Classical Receivers: *Ath. Pol.* 48.1–2.

20 Perhaps not only in the management of public property but also in the collection of taxes after the abolition of the *naukraroi*: see below, Ch. 5, pp.93–5.

21 Thuc. 1.96.2; see e.g. Samons 2000: 70–82.

22 Esp. Gabrielsen 1985 (cf. 1994: 19–24); Schubert 2008: 39–48. Other sceptics: e.g. Amit 1965: 19, 104–5 ('an insoluble riddle'); Haas 1985: 40; Whitehead 1986: 34; Hansen and Nielsen 2004: 628; also those who argue that there was no formal military organization in Athens before Cleisthenes: esp. Frost 2005: 106–7, 152–3, 175–90; Pritchard 2010: 8–15. Figueira 2011, however, offers a detailed discussion which does treat the *naukrariai* as a genuine archaic military and financial institution.

23 Kienast 2005: 75–81, rightly noting that demes existed alongside *naukrariai*, goes too far in concluding that *Ath. Pol.* must be wrong here: *naukrariai* may well have had financial functions only later transferred to the demes: below, p.60.

24 Photius s.v. ναύκραροι; Ammonius, *De diff. vocab.* s.v. ναύκληροι, ναύκραροι. Cf. Hesychius s.v. ναύκραροι: 'those who collected the *eisphorai* from each place'.

25 Naber's edition of Photius (1864) reads τοὺς ναυκράρους τοὺς κατὰ τὴν ναυκραρίαν, which would mean 'the *naukraroi* in the *naukraria*' and thus imply that there were several such officials within each unit. However, Lambert 1993: 253 n.36, reports on the authority of C. Theodoridis that the manuscripts do not in fact have the definite article τὴν, so that the meaning of the phrase was 'the *naukraroi* who, each in their *naukraria*,' [e.g. 'are responsible for collecting revenue']; cf. Lambert 1993: 387; Ostwald 1995: 370 n.7. This removes one apparent inconsistency in the evidence, and thereby one argument for regarding Pollux (below) as unreliable (Gabrielsen 1985: 44–5). It also removes the basis for several interpretations of the relation between the *naukraroi* and their 'chiefs' (below): e.g. Beloch 1913: 324; Kahrstedt 1934: 247–8; Hignett 1952: 70; Thomsen 1964: 132; Wallinga 2000: 142; Kienast 2005: 81.

26 To which we may add an archaic tradition about the role of the *naukraroi* in the Cylon affair: see below. Gabrielsen's dismissal of these five quotations as 'of uncertain origin' (1985: 24) is much too sceptical; there is no reason to doubt their archaic date.

27 It is sometimes argued that Cleidemus must have meant the tax symmories because only these numbered 100 before *c.*350, but this reasoning is circular: the only evidence for 100 tax symmories is this very fragment of Cleidemus (see e.g. MacDowell 1986: 444–6). In 354,

Demosthenes (14.17, 21) spoke of an existing division into 20 'large' symmories, and proposed a subdivision into 100; it is possible (so e.g. MacDowell 1986; Ruschenbusch 1978; contra e.g. Rhodes 1982: 5–11) that he was referring to symmories used for both fiscal and naval purposes.

28 Cleidemus thus modifies rather than contradicts Aristotle; the two sources are not irreconcilable (so also Figueira 2011: 187; contra e.g. Schubert 2008: 39, 45).

29 Lexica: Pollux 8.108 (below); *Suda* s.v. ναυκραρικά: 'probably named after being in charge of a ship'. Philologists: Wilamowitz 1893: I.96; Solmsen 1898; Keil 1902: 221. Etymological dictionaries: Frisk 1960–70; Chantraine 1968–80: s.v. ναύκληρος.

30 Etymology: Jordan 1979: 58–9; Billigmeier and Dusing 1981. Objections: Gabrielsen 1985: 47–9; Lambert 1986: 111 n.26; Ostwald 1995: 371 n.9; Wallinga 2000: 134 n.2; Figueira 2011: 184–5. The only voice in support is Frost 2005: 138 n.17 ('I still believe the theory of my former student Jon Billigmeier'). The off-hand suggestion by Rihll 1987 that *nau-* derives from ναίω, 'dwell', and *kraros* from κλῆρος, 'lot', has received no support at all. Scholars who nevertheless insist that the meaning of *naukraroi* is uncertain: Gabrielsen 1985: 47–9; 1994: 24; Hansen and Nielsen 2004: 628; Scott 2005: 468; Schubert 2008: 48; Pritchard 2010: 10.

31 Cf. Wallinga 2000: 139, who goes too far, however, in concluding that this refers to their position before they were fully incorporated into the Athenian state. Lambert's suggestion (1993: 254–5 nn.43, 46) that Pollux's final sentence refers to a Cleisthenic, not Solonian, system of providing ships is implausible since the rest of the text clearly describes Athenian administration before Cleisthenes.

32 The term used here, τριηραρχέω, is strictly speaking anachronistic because the ships would not yet have been triremes under Solon, but the word surely has the generic meaning 'to captain a warship' here.

33 So Gabrielsen 1985: 44–5; Schubert 2008: 46–8.

34 Polemarch: Rhodes 1981: 264–5. Cavalry: Spence 1993: 9–17; Bugh 1988: 4–6, 38. Gabrielsen 1985: 44–6, sees in these details mere assumptions and inferences.

35 Plut. *Sol.* 12.1–3, following Aristotle (*Ath. Pol.* 1; Heracleides, *Epitome* 2).

36 Andrewes 1982: 369; cf. Ostwald 1995: 371 n.11.

37 Agora Inv. P16873; Siewert et al (ed.) 2002: no. T1/153 (pp.134–9); ML 21.

38 Raubitschek 1947: esp. 259–60; endorsed by Rhodes 1981: 276–7.

39 So ML 21, p.42, following Wilhelm 1949: 237, taking the *prytaneis* vaguely as 'the leaders'; Siewert et al. (ed.) 2002: 134–9. Figueira 1986; 2011: 200–1 suggests that the 'chiefs' are a contemporary board of *prytaneis* of the *naukraroi*. Lambert 1986: 112, suggests that they are the *prytaneis* of the Council.

40 Siewert et al (ed.) 2002: nos T91–3 (pp.104–6); cf. T1/38 (p.83), 1/159 (p.144; pl. 4, p.525). Dates of ostracisms: *Ath. Pol.* 22.3–7; an alternative date for Megacles is 471.

41 Cf. *ostraka* calling someone 'the Alcmeonid': Siewert et al. 2002: T1/89–90, T1/62.

42 Cleisthenes: Herodotus 5.70, 72.1, 73.1; Thucydides 1.126.2; 127.

43 The contrast is expressed by μὲν […] δὲ; e.g. Lavelle 2005: 262 nn.92, 95. See van Wees 2002c: 341–4, n.6, on Herodotus' attitude towards the Alcmeonids.

44 See references in n.42, above; also *Ath. Pol.* 20.2.

45 The ancient notion that 'the archons used to be called *naukraroi*' (Harpocration and Suda s.v. ναυκραρικά) was explicitly based on Herodotus, and nothing else. Wüst 1957 suggested that 48 *naukraroi* plus 3 chief archons made the board of Fifty-One mentioned in Draco's homicide law – but if so, tradition would surely have called them 'The Fifty-One', rather than '*prytaneis* of the *naukraroi*'.

46 Lambert 1986: 107–9 (absence at Games); Jordan 1992 (arbiters).

47 So already Bonner and Smith 1930: 129–32.

48 Alternatively, the 'chiefs' might have been informal leading men among the Captains: cf. n.39, above. Possible military role of the 'thirds': Lambert 1993: 256–7 n.54. We have no other evidence for the structure of the archaic Athenian army. See below, nn.60, 67, for scholars who argue that no formal military organization existed.

49 Schol. Ald. on Aristophanes, *Clouds* 37: demarchs were 'previously *nauklaroi* [sic], whether instituted under Solon or even earlier. They organized the Panathenaic procession when Cleisthenes appointed them instead of *nauklaroi*'.

50 Thuc. 6.56, 58. *Ath. Pol.* 18.4 insists that this armed parade was only instituted 'under the democracy', but this claim is clearly motivated by the author's belief that the Athenian people had been completely disarmed in 546 BC (15.4–5), which is very unlikely: see Rhodes 1981: 210–13; van Wees 1998b: 336–7. Wheeled ship: Parke 1977: 39 (who sees it as a fifth-century innovation).

51 Envoys: above, pp.41–2; travel by ship: esp. schol. ad Ael. Arist. *Panath.* 189.8 (annual mission to Delphi); on 'sacred ships', see further below, pp.64, 79.

52 Jordan 1975: 11, suggests that the provision of 'sacred ships' was primary and that the military function of *naukraroi* was an extension of this original role.

53 *Ath. Pol.* 16.5 with Rhodes 1981: 215–16. Pre-Cleisthenic demes: Kienast 2005.

54 Billigmeier and Dusing dissociated the *naukraroi* from ships because they thought that formal power could not be derived from possession of a warship (1981: 11); many other scholars have implicitly taken the same view. Some posit that *naukraroi* were originally ship-owners with merely informal influence, and only later (e.g. under Peisistratus) became public magistrates: e.g. Beloch 1913: 324–7; Hignett 1952: 70–1; Wallinga 2000: 141–5. Figueira 2011 assumes that there were 'several hundred' *naukraroi*, qualified as such by having some 'sufficient requisite involvement in seafaring' (184–5, 197–8), but including only 'a few' who owned penteconters (186); the rest pooled resources to build penteconters and triaconters for the fleet (190–1).

55 Law: above, p.45; cf. Wallinga 2000: 142 n.15; Kahrstedt 1934: 248 n.2. Beloch 1913: 323, however, suggested that 'dispute' meant a refusal to accept the obligation.

56 Hostility to navy: Aristotle, *Pol.* 1327a40–b15; Plato, *Laws* 706c–7d. Late political impact: *Ath. Pol.* 23.1–2; 25.1; 41.2; Ar. *Pol.* 1304a20–4; see above, p.5.

57 *Ath. Pol.* 22.7; 23.1; cf. Ar. *Pol.* 1304a20–1.

58 Quotation: Myhre 1997: 169; cf. Christiansen 2002: 94–5, 108, 173; Lund 1997; 1994; Bannerman 1974: 49 (Hebrides); Hollister 1962: esp. 112–13 (England).

59 Eretria: Petrakos in *BCH* 87 (1963): 545–7; Chalcis: *IG* XII.9, 909, 923. Bakhuizen 1990, however, argues that they were private associations of sailors.

60 Pritchard 2010: 8 (acknowledging limitations of evidence); Frost 2005: 175–88; Scott 2000: 95–9, 106, 111–12; cf. 2005: 468 ('there is no history of regular maritime aggression which might motivate her to organize a navy'). Also e.g. Schubert 2008: 50 ('Athen war alles andere als eine Seemacht'); Haas 1985: 41, 45; Keil 1902: 221–2 (naval organization 'kann in dem Landstaat Athen […] keinesfalls autochthon sein').

61 Hdt. 5.81–9; 6.87–93; 9.75; cf. Thuc. 1.41.2. See further below, p.68.

62 Hdt. 5.74–7; on the expedition against Chalcis, see further below, p.68.

63 Naxos: Hdt. 1.64.2; *Ath. Pol.* 15.3. *c.* 500 BC, it was 'the most prosperous of the islands' (Hdt. 5.28), able to muster '8,000 shields and many warships' (5.30.4), and capable of resisting a Persian invasion (5.30–4). Delos: Hdt. 1.64.2; Thuc. 3.104.1–2; cf. Hornblower 1991: 517–25; Constantakopoulou 2007: 62–6.

64 Mutual naval raids: Aen. Tact. 4.8–11; Frontinus, *Strat*. 2.9.9; Justin 2.8.1–5 (Eleusis); cf. Plut. *Sol.* 8.4–6. Athenian ships capture port of Nisaea: Hdt. 1.59.4; Plut. *Sol.* 9.3 (implied). See further Lavelle 2005: 52–60; Frost 2005: 58, 63–6.

65 Hdt. 6.108, whose comment that the alliance with Plataea (dated to 519 by Thuc. 3.68.5) 'created trouble' between Athens and Thebes implies that there had been no previous conflict. Thebes' support for Peisistratus confirms this (Hdt. 1.61.3; *Ath. Pol.* 15.2). The only other land-based actions were defensive: against Spartan invasions in 512 and 510, perhaps fought by allied cavalry rather than Athenian infantry (Hdt. 5.63–4), and against the Persians in 490.

66 E.g. Beloch 1913: 326–7; Hignett 1952: 71, 78.

67 Solon frs. 1–3 W; Plut. *Sol.* 9.1–3; used as evidence against archaic navy by Pritchard 2010: 8–9; Hale 2009: 15; Frost 2005: 60–2; Scott 2005: 468; Haas 1985: 42–3.

68 Internal conflict: *Ath. Pol.* 1–2, 5; Plut. *Sol.* 12–13; the exile of the Alcmeonid faction may have been particularly significant: see below, p.64. Sigeum: Hdt. 5.95, inserting a flashback into his narrative about Peisistratus' campaign (so esp. Page 1955: 154–7); cf. Alcaeus frs. 167, 428 L-P; Strabo 13.1.38–9; Plut. *Mor*. 858ab; Diog. Laert. 1.74. One episode is dated to 607/6 by Eusebius, but this was evidently a long conflict.

69 Esp. Plato, *Phaedo* 58b; Plut. *Theseus* 21–3; Jordan 1975: 160–1.

70 An alternative tradition recorded by Plut. *Sol.* 8.4–6 suggests the use of normal warships, but is unfortunately no more reliable, muddled as it is with stories of Peisistratus' war against Megara (see Frost 2005: 56–64).

71 Law: Gaius ap. *Digest* 47.22.2 (Solon fr. 76a R). Vase paintings: Ahlberg 1971.

72 For older scholarship which drew similar conclusions, see above, Ch. 1 n.4.

73 The financial roles of demarchs implied by Aristotle are confirmed by an inscription of 475–450 BC in which demarchs collect an annual levy for Apollo (*IG* I3 138.1–6); cf. Davies 1984: 146–7. I see no basis for Kienast's view (2005: 78–81) that the demes had their later financial functions already before Cleisthenes. Sellers: above, pp.42–3.

74 Osborne 1985: 76–9, 83–7; Whitehead 1986: 130–8, 143–4; cf. Lambert 1993: 227–8.

75 Contra van Effenterre 1976; Frost 2005: 177–8, who speculate that before Cleisthenes 'phratry rosters' may have been used for military purposes. For deme registers, see e.g. Ostwald 1995: 377–9; Christ 2001: 401.

Chapter 4

1 Aristoph. *Wasps* 605–12. Abolition of pay: Thuc. 8.65.3, 97.1; [Ar.] *Ath. Pol.* 29.5, 30.2, 33.1.

2 Cleinias, son of Alcibiades, in 480 (Hdt 8.17; Plut. *Alc*. 1) and Alcibiades in 415 (Thuc. 6.50.1, 61.6, with Hornblower 2009: 425–6; contra Gabrielsen 1994: 202).

3 See above, pp.31–2. Sacred ships: Suda s.v. *Paralos* or *Salaminia; theoroi*; detailed discussion: Jordan 1975: 153–84; cf. Rhodes 1981: 687–8; Ostwald 1995: 372–3.

4 See Ch. 3 n.67, and Wallinga 2000: 139–40, esp. n.10 ('restriction to purely coastal defence'), and p.141 ('in due course' also offensive warfare); Raaflaub 2007: 134.

5 See Lavelle 2005: 67–89, 219–21 (unhistorical); cf. Anderson 2003. Sealey 1960. Lewis 1963 argued that the factions were named after where some leading men happened to live, but the Alcmeonid base was in Alopece, which is neither coastal nor distinctively Alcmeonid (Anderson 2003: 27–9; 2000), and in any case a faction named after its leaders would surely have been called 'the Alcmeonids', or 'those around Alcmeon', in the manner of classical Athenian political factions.

6 This dynamic had been forgotten by the fourth century, along with the chiefs of the Captains themselves, so *Ath. Pol.* 13.4–5 instead attributed oligarchic, democratic and 'moderate' political agendas to these factions and a third faction created by Peisistratus. The latter was based on the east coast of Attica, and is best understood as led by a group of ship-owning landowners breaking away from the Alcmeonids.

7 Hdt. 8.44.1 (180 ships), 8.1.2, 46.2 (20 Athenian ships manned by Chalcidians).

8 *Ath. Pol.* 22.7; Plut. *Them*. 4.1, 3; Polyaen. *Strat*. 1.30.6; Liban. *Or.* 9.38.

9 So Nepos, *Them*. 2.2, 8 (followed by Wallinga 1993: 148–57; Labarbe 1957). This was surely not an independent tradition but a scholarly attempt to reconcile the versions of Herodotus and *Ath. Pol.*

10 Hdt. 7.144.1–2; see also e.g. 6.8; 8.1–2, 42–8; Jordan 1975: 6–9.

11 More tenuously, the cost of the campaign suggests a trireme fleet: n.39, below.

12 Hdt. 6.89; Thuc. 1.41.2; these '(long) ships' are generally identified as triremes (e.g. Amit 1965: 18–10; Gabrielsen 1994: 34, 36). Scott 2005: 215, 325 disagrees.

13 Charon *FGrH* 262 F 10. Herodotus 5.99.1 in the same sentence does call the Eretrian ships explicitly 'triremes'; this is merely literary variation (Jordan 1975: 7–8), rather than a pointed contrast (Amit 1965: 18–20; Wallinga 1993: 133).

14 But of course one cannot exclude the possibility that it was a private vessel. The same applies to the four triremes with which Miltiades and other Athenian settlers returned from the Chersonese in 493 (Hdt. 6.41), though it seems to me likely that they were regarded as public property and absorbed into the existing fleet.

15 For references, see above, Ch. 3, n.58.

16 Herodotus attributes the expedition of 506 to a personal grudge held by Cleomenes I (5.74.1) but that is hardly the whole story; his explanation for a second (aborted) expedition a few years later is that Athens was growing dangerously powerful (5.91.1).

17 e.g. Krentz 2010: 43; Figueira 2010: 193; Walker 2004: 256–60.

18 Chariot group: Hdt. 5.77.4 (inscription: ML 15; Fornara no. 42). The stoa (ML 25; Fornara no. 43) commemorated a naval success, but it is not clear which one.

19 Thuc. 1.93.3, with Dion. Hal. 6.34.1 for the date; cf. Hornblower 1991: 138–9.

20 Since I suggest that the reformed *naukrariai* did not provide captains or crews, the appearance of the liturgical trierarchy (see below, pp.99–100) is no *terminus ante quem* for their abolition, as often suggested. Council and 'trireme-builders': *Ath. Pol.* 46.1; there was also a board of overseers of the dockyards and a range of other officials associated with the navy: see esp. Jordan 1975: 21–61; Rhodes 1981: 545–8; Gabrielsen 1995: 131–6.

21 Role and wealth of Athenian property classes: see below, pp.85–97.

22 Pay: Burrer 2008; Loomis 1998: 32–61; Pritchett 1971: 3–29. Booty: Pritchett 1991: 378–438. In a crisis, Athens might reward troops with plunder, but in hardly any of the instances listed by Pritchett (1991: 385–7) do the soldiers actually receive booty, rather than pay funded from the sale of booty.

23 Rise of wars for naval hegemony: de Souza 1998; van Wees 2004: 22–6, 30–2, 199–200; 2010: 135–9; Nagy 2009: I.8–12.

24 Scholia on Demosthenes, p.167.24–5 Dilts. Heath 2004: 132–83, argues that Ulpian drew on the work of Menander Rhetor, late third century AD.

25 Pay in 480: Plut. *Them*. 7.7 (citing Phanias of Eresos), 10.6–7 (citing Cleidemus *FGrH* 323 F 21); the 8 dr payment at Salamis (*Ath. Pol*. 23.1) is probably not regular pay: see below, n.38.

26 Ion of Chios *FGrH* 392 F 13 = Plut., *Cimon* 9.4 (date: Meiggs 1972, 72–3). 'Pay' here is called *trophe*, a synonym for *misthos* not only in the fifth century (Pritchett 1971: 4–5), but also in the fourth (Loomis 1998: 32–6). Cf. Plut. *Cimon* 13.6 (mid 460s).

27 The Eretrian law made no distinctions within the category of 'those who sail' (above, p.27), and nothing in the Athenian evidence suggests a distinction either. There is no basis for Pritchett's suggestion that naval pay was introduced (by Aristides) in the 470s but hoplite pay (by Pericles) in the 450s (1971: 12–13; wrongly followed by e.g. van Wees 2004: 236–7)

28 Cf. Singor 2000 (who, however, argues that many Greek 'allies' too were hired) *contra* Lavelle 1992; 2005: 139–43 (few non-Greeks troops, none hired).

29 Hippias' guard: esp. Thuc. 6.55–8. Peltasts and archers in art: Lissarrague 1990; Best 1968: 5–16; Vos 1963.

30 See van Wees 1998b: 336–7; Pritchard 2010: 12–13 n.62; cf. Rhodes 1981: 210–13, who notes the anachronistic detail in *Ath. Pol.* 15.4 (avoided in another version of the same story in Polyaenus 1.21.2) but does not dismiss the story as unhistorical. Herodotus does not mention the disarmament of citizens by Peisistratus, although it would have suited his anti-tyrannical agenda; he does not tell Thucydides' story either, but that may be simply because he gives no details of the assassination attempt at all. His account of 'the Athenians' mobilizing to rescue Plataea in 519 BC suggests a still-armed citizen militia (6.108.4–6). Events of 514–510: Hdt. 5.62–5; *Ath. Pol*. 19.

31 Polyaenus, *Strat*. 1.23.2 (contrast Hdt. 3.39.3, 45.3, on Polycrates' citizen archers); 5.1.2; cf. 1.21.2 (on Peisistratus). The story of Aristodemos of Cyme, *c.* 500, is more believable: to prevent outbreaks of violence, he had all weapons stored in temples, from where their owners could collect them in time of war (Dion. Hal. 7.8.2–3).

32 Hdt. 9.81.2; Diod. 11.33. Cf. e.g. Diod. 11.82.5 on campaign in Boeotia of 457. Distinction between general and select mobilizations, and

military service as a legal obligation: Christ 2006: 45–142; van Wees 2004: 99, 100, 102–3.

33 The same passage says that later, 'when they prepared for war', Athens added 2,500 hoplites (presumably permanent garrison troops within and outside Attica), 20 'guard ships', and 2,000 men who were sent out in other ships to collect tribute: if true, this probably happened only at the time of the Peloponnesian War.

34 The texts suggests that this happened after the Persian Wars and during the first 13 years of an otherwise unattested 50-year peace treaty between Athens and Sparta, ended by the outbreak of war over Aegina (i.e. 471–458 BC), but also associate it with events of the 490s, namely the return of Miltiades from the Chersonese and the fortification of Piraeus.

35 Plataea: Hdt. 9.22.1, 60.3. Decree: ML 23.25–6 (4 archers x 200 ships; cf. Plut. *Them*. 14.1). Ctesias *FGrH* 688 F13.30; *IG* I^3 138.1–6 (τὸς τοχσότας τός τε ἀστ[ὸς καὶ τὸς χσένος […]]: the contrast with 'citizens' makes the restoration of 'foreigners' almost certain); cf. Jordan 1975: 203–10. Marathon: Hdt. 6.112.2; suspected by van Wees 2004: 180, but plausibly defended by Krentz 2010: esp. 151: Bugh 1988: 8–13.

36 See Spence 1993: 9–15; Bugh 1988: 14–20, 39–52, noting vases from 510–500 (Basle, Cahn 133) and 480–470 BC (Berlin F2296) which show cavalry inspections. For the possibility that the late archaic cavalry was part-funded by liturgy, see below, p.99.

37 On the archers, see also Trundle 2010b: 147–52.

38 *Ath. Pol.* 23.1 presents the payment as the alternative to proclaiming that 'everyone should save themselves', i.e. arrange for evacuation from private means.

39 Inscription, *c.* 450 BC: *IG* I^3 21.10–15; Loomis 1998: 37–8. Paros: Nepos, *Milt.* 7.6; and Hdt. 6.136.3 for the fine. If the 70 ships (Hdt. 6.132) were triremes, and we estimate the accompanying 'army' (ibid.) at 1,000 hoplites, the total force would have comprised 15,000 men who, at 4 obols each, would have cost 10,000 dr p.d. The siege of Paros lasted 26 days (6.135.1): reckoning a total of 30 days for the whole campaign, the cost would have been 300,000 drachmas = 50 talents. For an explanation of a 4-obol daily rate, see below, Ch. 6, pp.131–2.

40 At an estimated 3–4 dr per *medimnos* of barley flour, and 10 dr per *metretes* of wine: see Markle 1985: 293–7 for classical prices. The standard ration was 1 *choinix* of barley and 1 *kotyle* of wine p.d.

41 So Parker 1996: esp. 77–9. I draw heavily on Parker's work in what follows.

42 Full edition of the texts with translation and commentary: Lambert 2002; cf. Rhodes 1991; Parker 1996: 43–55. Legal case: Lysias 30. Several fragments of Solon's laws also refer to the calendar (FF 81–6 R), and F 83 confirms the inclusion 'in the *axones*' of rites outside Athens.

43 Plut. *Sol.* 23.3 (F 81 R). Plutarch, ibid., also notes another law relating to values of 'sacrifices' (F 77 R), but may need to be emended: below, p.89.

44 See Parker 1996: 5, 7 and esp. 52–3, arguing that financial control was 'a prime function' of the calendar.

45 Prices discussed by Lambert 2002: 396–7.

46 Xen. *Anab*. 3.2.12; *Ath. Pol*. 58.1; with Parker 1996: 153–4.

47 For all the above, see in detail Parker 1996: 75–9, 89–101, 153–70, 186–7.

48 Theseus: *Agora* XIX, P26.479; cf. Plut. *Theseus* 23.5; Parker 1996: 169, 318. For private funding through liturgies, see below, p.100.

49 The simplest explanation for the 2 obols in Aristoph. *Wasps* 1188–9 is that they are a daily allowance paid to rowers on *theoriai* – not to envoys, who received lump sums (Loomis 1998: 203–19), nor to rowers on warships, whose attested daily wages are never lower than 3 obols (Loomis 1998: 32–61). Two obols as subsistence minimum: e.g. Demosthenes 4.28; Loomis 1998: 220–31.

50 See Parker 1996: 69–74; Boersma 1970; 2000. Acragas: Polyaen. *Strat*. 5.1.1 (200 talents). Delphi: Hdt. 2.180 (300 tal.; but schol. on Dem. 21.144 has 10 tal.).

51 Polyaen. *Strat*. 5.1.1 (Phalaris), 6.51 (Gorgos); *Ath. Pol*. 19.4 and Dem. 21.144 with schol. ad loc. (Alcmeonids; in a different version they actually spent more on the temple than they were obliged to do: Hdt. 5.62. 3); cf. Schaps 2004: 127–8. The basic accuracy of the stories is supported by the distinction between Phalaris' hiring of labourers and the hiring of mercenaries by Gorgos and the Alcmeonids, which fits the chronology of the first hiring of mercenaries within Greece: above, pp.71–3. For building contracts in general, see Schaps 1996; Kallet 2003: 122–4.

52 Secular public buildings in Greece at large: Hansen and Fischer-Hansen 1994; public building in Athens: e.g. Camp 1994; Hansen and Nielsen 2004: 633–6.

53 Harpocration, s.v. Πάραλος: 'those who embarked on it […] received four obols for their service and stayed at home for the larger part of the year' (i.e. but still got paid). Treasurer: *Ath. Pol*. 61.7; Jordan 1975: 181–5. Dem. 21.174 says that the treasurer of the *Paralos* was given 12 talents to spend, which suggests a wage of 1 dr per person per day, so that 4 obols

may have been an earlier rate of pay (see above, n.38; contra Loomis 1998: 49). Jordan 1975: 172–3, cites further sources and argues that the *Paralos* was used for diplomatic missions only.

54 The 'law of hybris' as quoted in Dem. 21.47, which was genuinely Solonian (Fisher 1992: 36–85; van Wees 2011b), stipulates that those convicted are to be kept 'bound' until they pay their fines. Prison: Camp 1986:113–16.

55 Artemisia: Hdt. 8.93; Pindar: Isoc. 15.166; Aristides' son (who also received 4 dr p.d., and an allotment of 200 *plethra* of land): Dem. 20.115; Plut. *Arist*. 27.2.

56 Peisistratus: Plut. *Sol.* 31.3–4, who adds that according to Heracleides Ponticus (fr. 149 Wehrli) Solon had previously awarded the same privilege to a certain Thersippus. The scenario seems plausible: what was a rare privilege under Solon became an institutionalized form of reward under Peisistratus; cf. schol. ad Aesch. 1.103. Polycrates: below, p.100.

57 Dole: Lysias 24.13, 26 (1 ob.); *Ath. Pol*. 49.4 (2 ob.); attributed to Solon by schol. ad Aesch 1.103. Cf. Stroud 1971: 288–9; Raaflaub 1998: 30–2. For the public funeral, see esp. Clairmont 1983.

Chapter 5

1 Above, Ch. 2, p.29. Cf. the telling custom at Mende: 'tax on land and houses' was not raised while harbour and other taxes sufficed, but records of property owners were kept for use if necessary ([Ar.] *Oec*. 1350a7–12).

2 Note Pleket 1973: 251–2 on the likelihood that the financial needs of most 'normal' cities would override their reluctance to tax citizens. It does not follow, however, that this would have led to 'regular' direct taxation: in the absence of standing armies (or navies), the greatest expenditures were always irregular.

3 Cf. de Ste Croix 2004: 42–4, who, however, goes too far in claiming that other income taxes were inconceivable in the ancient world: taxes on non-agricultural income are mentioned at [Ar.] *Oec*. 1346b22–4 (one-third on income of 'wonder-workers, diviners, drug-sellers and others of that ilk' in Byzantium), 1351a10–12 (proposed 10 per cent on money earned 'from ships, workshops and other sources of gain').

4 Rhodes 1981: 215; Hornblower 2009: 444. Cf. previous note, and [Ar.] *Oec*. 1345b32–3, citing 'tithe' as a common generic term for a tax 'on the land'.

5 So Boeckh 1886: 398; Rhodes 1981: 215 (new). A letter by Peisistratus quoted by Diog. Laert. 1.53 says that 'each Athenian' paid the tithe, but apart from being obviously not genuine, this surely means only 'each liable Athenian'.

6 Cf. Pleket 1969: 45–7, who calls the tithe 'a sort of *eisphora*'. *Pace* Sancisi-Weerdenburg 1993: 28, the anecdote about Peisistratus' grant of 'exemption from all taxes' to a farmer cultivating a rocky piece of land (*Ath. Pol* 16.6; Diod. Sic. 9.37.2–3; *Suda* K 1206, Σ 1711; Zenob. 4.76) does not prove the contrary: the farmer is rewarded for his 'love of labour', not pitied for his poverty, so that he may well be envisaged as a landowner determined to cultivate even marginal land.

7 Cf. Descat 1990: 97–8. Our sources do not use the term *eisphora*, but the passage from Plato cited above shows that these levies would have been thought of as such. Dem. 22.77 = 24.185 uses 'to tithe' for recent *eisphora* levies on property.

8 Common elsewhere: Hdt. 6.46.3, cited above, p.29. Sancisi-Weerdenburg 1993: 25–9; Harris 1997: 110–11, argue that Peisistratus' tithe was not a tax on landowners in general but a payment owed by those who received loans from Peisistratus; it made him popular because it replaced older levies of one-sixth (on the so-called *hektemoroi*) by private landowners. This turns both the tithe and the sixth into something quite different from what the sources suggest: see van Wees 1999: 18–24, on the one-sixth.

9 The views that there were 6,000 tax-payers (Jones 1957: 83–5), or 9,000 (Brun 1983: 15–22), or even more (Thomsen 1964: 195–206), in the fourth century seem to me to have no basis in the evidence. For a total fourth-century citizen population of 30,000, see e.g. Hansen 1985; van Wees 2011a.

10 E.g. Boeckh 1886: 586 (fiscal function of property classes 'extremely rarely' used); Thomsen 1964: 139 ('informal' fiscal role); Rhodes 1981: 140 ('unwise to rule out the possibility' of fiscal function); de Ste Croix 2004: 8; Valdés Guía and Gallego 2010: 268.

11 Cf. Ostwald 1995: 375–6; van Effenterre 1979: 28–9; Boeckh 1886: 584–5.

12 E.g. Hignett 1952: 100; Beloch 1885.

13 So Boeckh 1886: 579–80; van Wees 2006: 352–3; contra Whitehead 1981: 283–5, who argues that this was a tax on the profits of ox-breeders: Pollux would hardly have included such a minor levy in his short list of otherwise major taxes.

14 De Ste Croix 2004: 13–24; van Wees 2006: 371–5. Different views: n.22, below.

15 'Just as they were divided even earlier' is unlikely to be a later insertion into the text: Rhodes 1981: 137. Note also that both military and fiscal functions were defunct by the time of *Ath. Pol.* and its sources, whereas some political rights and legal obligations were still notionally linked to property classes.

16 Numerous scholia and lexica also contain (part of) this information, but add no further details; the references were assembled by Boeckh 1886: 580.

17 The small wealth-gap between *zeugitai* and *hippeis* was noted by Boeckh 1886: 581; also de Ste Croix 2004: 47–8. Further calculations: Foxhall 1997; van Wees 2001; 2006; 2013; Rosivach 2002a: 36–8. The validity of these calculations is now widely accepted: e.g. Raaflaub 2006: 405; Pritchard 2010: 23; Valdés Guía and Gallego 2010: 268.

18 De Ste Croix 2004: 46–51; Rosivach 2002a: 39–47; Rhodes 1981: 143 (quantification a scholarly guess); Raaflaub 2006 (quantification established *c.* 460); Valdés Guía and Gallego 2010: 270–7 (quantification established *c.* 400 BC for purposes of levying *eisphora*).

19 De Ste Croix 2004: 55–6, suggested that the *pentakosiomedimnoi*, unlike the other classes, needed precise definition to ensure that they owned enough land to be safe from financial temptation if elected as Treasurer of Athena, a position for which only this class was eligible. This rather feeble explanation fails to explain why the same need was not felt in the case of lower property classes eligible to serve as *kolakretai*.

20 FF 60a–62 R (Plut. *Sol.* 23.7; Gaius ap. Digest 10.1.13). Note also e.g. F 35 R (Plut. *Sol.* 24.3) which specifies the length (3 cubits) of the leash for a rabid dog.

21 Raaflaub 2006: 415–21, suggests that it was raised to reduce the number of people liable to hoplite service and free up manpower for service in the fleet – but does not address the reduction in the number of tax-payers which this entailed. Valdés Guía and Gallego 2010: esp. 275, suggest that it was (*de facto*) raised so as to allow the imposition of *eisphora*-obligations on the wealthier *zeugitai*, but they overlook the consequent reduction in number of hoplites liable to serve. Both theories, crucially, fail to give enough weight to the reduction in number of full citizens which would also have been a consequence of raising the threshold.

22 See Gabrielsen 2002: 86–8, 95–8; Rosivach 2002b; Pritchard 2010: 23–6, none of whom to my mind succeed in satisfactorily explaining

away what little evidence we have (Thuc. 6.43.1; Aristoph. fr. 248 K-A, as persuasively interpreted by de Ste Croix 2004: 13, 20–1). The discussion of property classes in Arist. *Pol.* 1297a29–b15, assumes that military service is a vital part of any property class system; see next note.

23 See van Wees 2001; 2006; 2013. The distinction between wealthy hoplites serving under a legal obligation and poorer hoplites serving under a merely moral obligation in general levies or on a voluntarily basis as marines, etc., has been criticized (Gabrielsen 2002: 87–8; Christ 2006: 49; Valdés Guía and Gallego 2010: 259–61), but corresponds exactly to a distinction made in Aristotle's discussion of how property classes should work: *Pol.* 1297a29–b15: the rich are obliged to serve, the poor are encouraged to serve for pay.

24 The fund is called 'the naukraric silver' in Aristotle's citation of a Solonian law (above, p.45), but in a fuller quotation is simply called *ta naukrarika*, 'the fund for the Captains' (above, p.41), so that it might contain resources other than silver. Aristotle was thus not quoting exactly but paraphrasing the gist of such laws.

25 Emendation: Wilcken 1928: 236–8; objections by Ste Croix 2004: 45–6, 67–8.

26 So de Ste Croix 2004: 36–40, who speaks of a 'barley-standard'.

27 A Solonian law allowed the lender complete discretion in setting interest rates on loans of silver: fr 68 R (Lys. 10.18); cf. Kroll 1998: 228–9.

28 Solon rated a silver drachma worth 3 or 4 times more barley than its value in classical Athens, but a sheep 4 to 5 times worth less barley than it was later. Bovines were worth 5 times more than sheep (Plut. *Sol.* 23.3, cited above, p.89, but see also below, Ch. 6, p.122), which is similar to the classical ratio of *c.* 6:1 (noted by Lambert 2002: 396–7). Archaic livestock owning: van Wees 2009: 450–1.

29 Thomsen 1964: 136–7, suggests that centralization occurred under Peisistratus, but since the *naukrarika* already featured in Solon's laws, this seems too late.

30 As attested by the grain-tax law of 374/3 (RO 26): Stroud 1998: 85–104.

31 Calculated at 1 *choinix* of barley flour and a *kotyle* of wine per day, the annual ration comes to 7.5 *medimnoi* and 2.5 *metretai*. This is well above the minimum calorific requirement: Foxhall and Forbes 1982.

32 One-third of 20,000, with a relatively low proportion of *zeugitai* and thus a relatively high rate of 1.5, gives 10,000, while half of 30,000, with a high proportion of *zeugitai* and a low rate of 1.0, gives 15,000. For

the population figure *c.* 500 BC, see van Wees 2004: 243. Proportion of *zeugitai* if regarded as equivalent of hoplites: e.g. Hanson 1995: 105, 114 (nearly half); 208, 406 (one-third to half).

33 15 per cent of 20,000 = 3,000 at a rate of 1.5 = 4,500; 15 per cent of 30,000 = 4,500 x 1.5 = 6,750. For the 15 per cent proportion, see van Wees 2006; 360–7; 2011a.

34 *Ath. Pol.* 21.5; above, p.45. As Descat 1990: 97 notes, no source says that the Peisistratid tithe was abolished.

35 Athens: *IG* I3 1.2–3 = ML 14.2–3; suggested restorations include: 'when they must at Athens pay tax and perform military service' (Meritt 1939–53); 'pay in tax what citizens must pay and perform military service' (Wade-Gery 1951); 'pay tax in the same way as they pay tax at Athens and perform military service' (Guarducci 1945).

36 So Hornblower 1991: 404 (contra e.g. Schubert 2008: 55–64); cf. Griffith 1977; Thomsen 1964: 146.

37 E.g. Hignett 1952: 100; Brun 1983: 11–12; and cautiously Rhodes 1981, 140. It was accepted as accurate information by Boeckh 1886: 580–90 and Thomsen 1964: 16–23, 105–18 (whose explanations are however unsatisfactory: see below), and as being based on fact but seriously confused by de Ste Croix 2004: 29–30, 57–80 (who suggests a Cleisthenic date) and Valdés Guía and Gallego 2010: 271–5 (suggesting a date *c.* 400 BC).

38 Pollux's text also appears in a scholion to Plato, *Rep.* 550c.

39 Except on the widely rejected interpretation of Boeckh 1886: 580–90 (below).

40 Thomsen 1964: 105–18 (rashly followed by van Wees 2001: 54–5) nevertheless assumed that 100 symmories (for which see above, Ch. 3, p.46) paid the fifth-century *eisphora*. Since demarchs collected *eisphora,* it could not have been paid by the 50 Cleisthenic *naukrariai*.

41 Boeckh 1886: 580–90: if the highest class was taxed on its entire property, the 5:3:2 ratio for income compared with the 6:3:1 ratio for taxable property implies that *hippeis* were taxed on only 5/6th of theirs and *zeugitai* on 5/12th of theirs. Rejected: Beloch 1885: 245; and e.g. Hignett 1952: 100; Thomsen 1964: 16–23.

42 So e.g. Brun 1983: 7. For the metic 'sixth', see e.g. Thomsen 1964: 96–104. The creation of a formal status of *metoikos* – and attendant tax obligations? – is generally attributed to Cleisthenes' reforms: e.g. Whitehead 1977: 140–7.

43 Deme registers: above Ch. 3, n.75. The generals' ability to hand-pick hoplites for expeditionary forces suggest that central lists of members of

eligible property classes were available, even if there was no 'hoplite list': cf. van Wees 2004: 103.

44 Perhaps the figure of 1 dr for the lowest tax-paying class in the smallest deme was the base from which all other proportions were derived: this would explain why contributions were expressed as shares of 2 talents, rather than 1.

45 Bouleutic quota: esp. Rhodes 1972: 8–12. The discretion attributed to the demarch in the second scheme is similar to the discretion exercised by 'leaders' of symmories and *proeisphora*-payers in the fourth century.

46 Quoted above, p.85; cf. Valdés Guía and Gallego 2010: 263–4, who however assume that this was a recent innovation and unrelated to the property classes.

47 One reason why scholars have rejected Boeckh's interpretation of Pollux's scheme (see above, n.41) is that they do not believe that a system under which the rich paid higher rates than the poor(er) was conceivable in ancient Greece. Yet a simple form of the 'progressive' principle was actually embedded in the custom of taxing only those above a certain high property threshold and not taxing the 'poor' at all, as well as imposing extra financial burdens (liturgies) on the very richest. Moreover, the new system as interpreted here did not rely on unparalleled sliding scales of tax-percentages or notional 'taxable properties', but, like the older *eisphora*, on graded fixed amounts – 25, 15 or 10 *medimnoi* under Hippias; a share of (multiples of) 6,000, 3,000 or 1,000 drachmas under Cleisthenes.

48 For the others, see Ch. 2 n.35 (Cypselus), n.38 (Lygdamis), p.35 (Spartans).

49 So e.g. Amit 1965: 103; de Libero 1996: 126–7; cf. 237–8. For the greed of (classical) tyrants as a topos, see Kallet 2003: 122–4.

50 Formal markers set up to define the space of the agora, *c.* 500 BC: Camp 1986. Peisistratid dedication of Altar of Twelve gods as centre of Attica (Thuc. 6.54.6; ML 11; Fornara no. 37); half-way points marked by Hipparchus' herms: [Plato], *Hipparchus* 228c; *CEG* 304; Slings 2000: 58–60. Trees overhanging public space are treated as public property at [Ar.] *Oec*. 1348a24–5.

51 So Wilson 2000: 15; cf. Schubert 2008: 49–50; contra Lewis 1988: 290–1; Jordan 1975: 15.

52 So e.g. Jordan 1975: 15–20; Wallinga 1993: 156–7; Gabrielsen 1994: 35 (480s).

53 Finance of classical trierarchy: see esp. Gabrielsen 1994.

54 Douris of Samos *FGrH* 76 F 63; cf. Shipley 1987: 90.

55 Solon's export ban: see above, Ch. 1, pp.12–13. Pottery: e.g. Osborne 1996b, arguing for export consciously catering for specific foreign markets.

56 Lead isotope analysis of Athenian coins: Stos-Gale and Gale 2009: esp. 200–1, Table 2, Fig. 1; Gale et al. 1980. Similar conclusions based on neutron activation analysis: Kraay 1962: 14–16. Ingots, scraps: Stos-Gale 2001: 61–2 (Tel Miqne, Israel), 66 (Selinus). Litharge at Thorikos: Mussche et al. 1967: 29–30. Further below, Ch. 6.

57 Nationalized by Cleisthenes: e.g. Conophagos 1980: 88. Public revenue from mines on Siphnos and Thasos: above, p.36; Macedonia: Hdt. 5.17.

58 For the evidence, see esp. Anderson 2000; 2003.

59 Laurion silver: see n.56 above. North Aegean mines lost to Persians in the aftermath of Darius' Scythian expedition: Hdt. 5.1–2, 11, 23; the *Chronikon Romanum* (*FGrH* 252 F 8) synchronizes this expedition with the assassination of Hipparchus, but this need not be exact; moreover, the follow-up campaign conducted by Megabazus to occupy Thrace and the mines may have happened in the next year (just as Xerxes' campaign in Greece in 480 was followed by a smaller campaign under Mardonius in 479); access to the mines could thus have been lost as early as 514 (so Wade-Gery 1951: 215–16) or as late as 512. Intensive exploitation of Laurion, *c.* 515 BC: Picard 2001.

60 Costs will have fluctuated – as Gabrielsen 1994: 139–42, stresses – but a minimum of 5,000 dr, as attested in the fourth century, still seems likely.

61 Hdt. 3.57; Siphnos could surely only afford such exceptional construction thanks to mining revenue, and as 'secular' structures they could hardly have been funded from the 'tithe' for the gods (from which the Siphnian treasury at Delphi was built). Indeed, the point of Herodotus' story lies in the contrast between the Siphnians' and Athenians' use of mining revenue for 'luxury' buildings and military purposes, respectively: above, p.36.

62 Nepos, *Them*. 2.2 ('annual' distribution by 'magistrates'); Plut. *Them*. 4.1 ('habit'). Polyaen. *Strat*. 1.30.6, by contrast, tells the same story as Aristotle.

63 E.g. distribution of confiscated property of Diphilos at 50 or 100 dr per man ([Plut.] *Mor*. 843d); distribution of donated grain: Philochorus *FGrH* 328 F 119.

64 Allied fleets of 200 ships: Plut. *Cim*. 12.2 (at Eurymedon; cf. Thuc. 1.100.1); Thuc. 1.104.2, 112.1 (Cyprus and Egypt, *c.* 460 and 451 BC). Uniquely, Diod. 11.60.3 claims a total of 300 ships for an early expedition to Caria and Lycia. Samons's objection that 'ancillary costs' would add so much to the wage bill that the tribute 'probably would not have

sufficed' to fund expeditions (2000: 93) is misplaced: provisions were not normally supplied centrally but bought by the crews; much of the cost of maintenance was borne by trierarchs.

65 Contra Meiggs 1972: 66, this story does not prove that the Athenian treasury rather than tribute normally paid the wages of Athenians on League campaigns.

66 The estimates of League expenditures by Unz 1985: 24–5, and (more cautiously) Samons 2000: 305–11, overestimate the cost of campaigns and fail to consider the extent to which this was off-set by revenue from booty; cf. Plut. *Cim*. 13.5–7 for the large profits of the Eurymedon campaign.

67 Diod. 12.38.2 (8,000 tal. transferred), 40.1 (money transferred from Delos implicitly equated with total surplus in Athenian treasury), 41.1 (Ephorus cited as source); 12.54.3 and 13.21.3 (10,000 tal.); discussion in Samons 2000: 94–100.

68 E.g. Samons 2000: 93, 307; Meritt et al. 1950: 237–8.

69 This would be the implication of spending 3,700 tal. on the Acropolis building programme and on military campaigns (Thuc. 2.13.3) from a surplus which according to Ephorus consisted entirely of League funds.

70 Esp. *Ath. Pol*. 24; see above, Ch. 4, p.70.

71 The figure of 100 talents or more is based on the difference between the tribute of 460 tal. and the annual income 'from the allies' of about 600 tal. given by Thuc. 2.13.3, as explained by Hornblower 1991: 145–6, 252–3; Samons 2000: 305–11. *Ath. Pol*. 24.3 also assumes income 'from the allies', other than tribute. The 600 tal. of 431 included at least some revenues, such as from Amphipolis (Thuc. 4.108.1, noted by Hornblower), which became available only after 462.

Chapter 6

1 The names of the Mycenaean measures are unknown; see Chadwick 1976: 105–8. For classical measures, see Forbes and Foxhall 1982.

2 Bronze Age: Chadwick 1976: 102–5; Alberti 2006; Aravantinos and Alberti 2006. Athenian weights: Lang 1964: 3, citing *IG* II^2 1673 (30 staters/talent), and next note.

3 Inscribed weights before 480 BC: Lang 1964: Stone Weight 16 ('double stater', 1737.5 gr); Bronze Weight 1 ('stater', 795 gr); BW 2 ('quarter', 190 gr); BW 3 ('sixth', 126 gr); Pernice 1894: no. 1 = Hitzl 1996: 112 n.660 (*IG* I^2 917; 'half',

426.63 gr); see also nn.51–3, below, for these and uninscribed early weights. Fourth-century weights: Lang 1964: Lead Weight 6 ('stater', 841.5 gr); LW 34 and 37 ('quarter', 302 and 234.5 gr); LW 26 and 29 ('sixth', 155.5 and 136 gr); LW 47 ('eighth', 105 gr); LW 56 ('sixteenth', 55.5 gr); possibly also LW 20 ('third', 301 gr). The earliest inscribed Athenian weights which call a mina a 'mina' rather than a 'half stater' are dated to *c.* 300 BC: Lang 1964: LW 12, 16 (471 and 422 gr). The measures listed in e.g. Hero, *Geometrica* 23.55; Pollux 9.86 must reflect Hellenistic usage; cf. n.13 below.

4 The problem remains with a stater of 210 dr (below, pp.117–19): here, a half, third and sixth amount to round numbers of drachmas but the other divisions do not.

5 πρὸς ἀργύριον: *IG* II/III^2 1013.29–37.

6 Michailidou 2001: esp. 86–7, 99–100, on Pylos tablet Jo 438 (Kn01).

7 Mesopotamian systems: Powell 1990: 508–11 (60 shekels of 8.3 gr per mina). Levantine systems: Rahmstorff 2006: 21–2; Ascalone and Peyronel 2006: 128–9; Ascalone 2006, all also noting an Early Bronze Age mina of 70 shekels of 6.6 gr.

8 As emphasized by Kroll 2001: 80; 2008: 42. These silver staters are not to be confused with Athens' normal, much heavier, 'trade' staters; see further below.

9 Kroll 2008: 38–42, identifies nos 1, 3, 5, 7, 9 as 'Babylonian' (8.3 gr shekel), nos 15–16 as 'Palestinian' (10.5 gr). Nos 2, 6, 13 seem to me based on a 'Hittite' 11.7 gr shekel (called 'Sidonian' at Tyre); nos 10–11 might represent 8 such shekels. (Kroll argues for a 9.4 gr standard instead). For the eighth-century finds from Tyre, see Elayi and Elayi 1997: esp. 319. The weight of nos 4, 8, 12 and 14 can no longer be determined.

10 Pithecusae weight: Ridgway 1992: 34, 95, 139; lead gains weight through oxidation, so its original weight was surely within the 8.64–72 range required (Kroll 2008: 45). Standard in Euboean settlements: Kraay 1976: 133, 206–8; Crawford 1986: 7.

11 Sources: Melville-Jones 1993 nos 589–90, 592–7, 599–602, 626, incl. Hdt. 3.89, 95; *I.Priene* 123.5–7, and many occurrences in Roman treaties; cf. Kroll 2008: 44–5.

12 Weight of 432 gr: Kroll 2008: 45 nn.8–9; the consensus assumes 436 gr.

13 Of almost 500 classical weights at Olympia, where the Aeginetan standard ought to have prevailed, the largest category ('class A') uses a 432–6 gr mina, and not a single weight corresponds to a 620 gr mina or its subdivisions: see Hitzl 1996: esp. 53; contra e.g. Figueira 1993: 74–5. The written sources which refer to a larger Aeginetan mina (esp. Hero,

Geom. 23.56, 59; Pollux 9.86) must refer to the Hellenistic period, when other weight standards had probably been raised as well; note that they cite weight ratios between the Aeginetan and Attic drachma which did not exist in the archaic or classical period, namely 10:8 and 10:6 rather than the correct 10:7.

14 The table is based on Kroll 2001: 80; Nicolet-Pierre 2002: 135–43.

15 Confirmed by the numerous multiples of 35/70 occurring in inscriptions which give sums in Aeginetan drachmas, esp. in fourth-century Delphi (Crawford 1972: 7 n.7), but also in early fifth-century Crete (350 staters = 10 minae: *Nomima* no. 7) and Olympia, *c.* 450 (140 dr = 2 minae: *Nomima* II no. 60). On Corinth, see also Hitzl 1996: 113–14.

16 A late sixth-century Athenian weight of 177.52 gr inscribed 'ten staters' (*IG* I^2 918; Pernice 1894: 31–2, no. 2) implies that the tetradrachm of 17.4 gr was already called 'stater' at this stage, as it was later; cf. Hitzl 1996: 112 n.658.

17 Survey of weight standards and denominations: Kraay 1976: 329–30; cf. 9, 89–91, 133; Nicolet-Pierre 2002: 114–23. Early coinages in Corcyra, Sicily and Italy consisted of lighter staters and fractions.

18 A 'half-talent' of gold (*Il.* 23.751, 796) is worth less than an ox (750); 2 talents (23.269 = 614) are worth less than a 4-*metron* bowl (267–8), while 1 bowl is worth an ox (23.885). At *Od*. 8.393 with 430 and 13.10–15, a talent of gold evidently weighs less than a drinking cup and goes with gifts of cloth, rather than with later, richer gifts of tripods and bowls. Note also *Il.* 9.122 = 264, 24.232 (10 tal.); *Od*. 24.274 (7 tal.); and passages cited below. Cf. Seaford 2004: 31–2.

19 Hero, *Geometrica* 23.58. Daric and Babylonian shekel: Powell 1990: 511. Nicolet-Pierre 2006: 15–18 suggests that Homer's *talanton* refers to a type of small gold disc found in Mycenaean graves, but since these discs are not of standardized weight (they range from 1.5 to 3 gr) they cannot account for Homer's 'half-talent'.

20 Half-axes: *Il.* 23.850–1, 856–8, 882–3; in theory, they might be single as opposed to double axes, but the word for the former is ἀξίνη. 'Axe' as weight: Eustathius p.1878 on *Od*. 19.573; schol. Ven. A, B and T on *Il.* 23.851; Hesych. s.v. ἡμιπέλεκκον; all discussed by Jeffery and Morpurgo-Davies 1970: 144; cf. Richardson 1993: 266. At *Il.* 23.826–49, the prize is an ingot of iron (used as a discus) of unspecified weight.

21 Spensithios: *Nomima* 22.11–12; Onasilas: *Nomima* 31.15, 25; see above, pp.23–4. These are large amounts of meat (up to 45 kg) and silver (up

to 4,000 dr), but not implausible for an annual contribution or wage. If the 'axe' here were a measure of value, rather than weight, the amounts provided would surely be too small.

22 This is not to say that gold could not be used as an occasional means of exchange, or that it was confined to a closed 'sphere of exchange': see next note.

23 ἀρεσσάμενοι […] ὅσσα τοι ἐκπέποται καὶ ἐδήδοται ἐν μεγάροισιν, τιμὴν ἀμφὶς ἄγοντες ἐεικοσάβοιον ἕκαστος, χαλκόν τε χρυσόν τ' ἀποδώσομεν: the participles 'making up' and 'contributing' are dependent on the main verb 'to give (back)', so – contra Schaps 2004: 70 with n.35 – the poet does not suggest that the cost of the food, the value of 20 oxen, and the gold and bronze were three separate payments. This passage is clear evidence that there were no separate 'spheres of exchange' in Homer but that even highly prestigious gold could be measured against, and given in exchange for, humble grain, meat and wine: see van Wees 1992: 222–7; 2002c; contra Morris 1986. Other values in 'oxen-worth': *Od.* 1.431 (slave); *Il.* 2.447–9 (golden tassels of aegis).

24 Καὶ μὴν κἀν τοῖς Δράκοντος νόμοις ἔστιν ἀποτίνειν εἰκοσάβοιον, Pollux 9.60–61. Pollux ibid. also mentions the Delian prizes in numbers of oxen. On 'oxen-worth', see also e.g. Schaps 2004: 69–71; McInerney 2010.

25 *Nomima* II.11 (*IC* IV 8a–d); the editors rightly translate 'un trépied (valant?) dix chaudrons'. The tripod is thus not a standard measure or means of exchange: so correctly Schaps 2004: 83 n.9, contra e.g. Von Reden 1997: 158; Guarducci 1945.

26 See *Nomima* no. 12, 82; II.22, 38, 92; Schaps 2004: 82–3.

27 Etymology: Plut. *Lys.* 17.5; Pollux 9.77 (Arist. frs. 481, 580 Rose). Spits abolished: *Etym. Magn.* s.v. ὀβελίσκος. Cf. Schaps 2004: 83–5; Seaford 2004: 102; and below.

28 For the finds, see esp. Strøm 1992; Tandy 1997: 156–61; Seaford 2004: 103–8.

29 So Von Reden 1997: 160; Kroll 2001: 87; Nicolet-Pierre 2002: 90–103; contra Schaps 2001: 95; 2004: 87; Seaford 2004: 104; Courbin 1959 (spits as medium of exchange).

30 Discussed by Strøm 1992: 45–9, and Seaford 2004: 103, 108 n.34, who, however, stress the possibility that actual spits may have been attached to these offerings.

31 It is thus unlikely that they served as 'utensil money', contra Schaps, who concedes that it is odd 'to demand that each citizen be ready with what

can only seem to us the inventory of a small housewares shop' (2004: 83; cf. nn.25, 29, above).

32 So Seaford 2004: 102–9; Von Reden 1997: 160; Strøm 1992: 48; Laum 1924.

33 *Lebes* for handwashing: e.g. Hom. *Od*. 1.136–8 = 4.52–4 = 17.91–3; 3.440; at *Il*. 23.267, it is implied that a large *lebes* could be used as a cooking vessel, but the usual translation 'cauldron', which I have avoided here, is surely misleading. Contra Strøm 1992: 48, the *lebes* is not used as a drinking vessel.

34 Platon and Feyel 1938 (= Melville-Jones 1993 no. 39).

35 See Schaps 2004: 57–62; given the nature of the records, however, measures of value would not necessarily have been mentioned even if they did exist.

36 Ephorus *FGrH* 70 F 115.20–35; F 176 (= Strabo 8.3.3; 8.6.16); Parian Marble, *FGrH* 239 F 30; *Etym. Magn*. 3.613.13; Fornara no. 4; Melville-Jones 1993 nos 27–30.

37 RO 45, col. ii.1–4; Theophr. *Char*. 30.11; Hitzl 1996: 25 n.177; Rhodes 1981: 165–6.

38 Kraft 1969 (Solon made 60 minae of coins weigh 63 minae, i.e. 1/20th heavier than a non-coin weight); Rhodes 1981: 167, and Kraay 1968 (he made 63 minae of coins weigh 60 minae, i.e. 1/21th lighter than a non-coin weight, in order to give the State a profit-margin in minting coins: cf. Le Rider 2001: 257–60; Nicolet-Pierre 2002: 108).

39 Similarly e.g. Hitzl 1996: 11, 147–9; Lang 1964: 2–3.

40 Inscribed weights: Kroll 1971. Increase: decree cited in n.5; Hitzl 1996: 11–14.

41 Contra Rhodes 1981: 165; Kraft 1969; Kraay 1968.

42 So e.g. Rhodes 1981: 166; contra e.g. Hitzl 1996: 147–9. For the weight of the drachma coin (often cited instead as 4.36 gr), see esp. Kroll 2008: 45 nn.8–9.

43 So e.g. Hitzl 1996: 149. Alternatively, this may be an elliptic way of saying that the didrachm had been the standard coin before Solon, and that he was responsible for the introduction of the tetradrachm, as suggested by e.g. Kraay 1968.

44 Manuscript error: Rhodes 1981: 164 n.15. Conflation: Hitzl 1996: 151. Assumed 'trade' mina of 73.5 dr: Lang 1964: 2 n.1.

45 So Crawford 1972; cf. Rhodes 1981: 168.

46 Among more than 350 Athenian weights tabulated by Lang 1964: 15–16, the single largest group, 69 weights, corresponds to a 210-dr/910-gr stater, within a margin of 1 per cent, while 34 and 39 are within the

same margin of a 200-dr and 220-dr stater, respectively; a further 99 fall between these groups and could belong to either of two standards. Extending the margin to 3 per cent would include another 45 weights, a total of 286. Hitzl 1996 assigns almost all of more than 450 weights at Olympia to one of the three standards; he dates the appearance of a 210-dr stater to *c.* 450 BC and the appearance of a 220-dr stater to the 420s (esp. p.139). The earliest probable 210-dr stater published by Lang (LW 56, 'one-sixteenth' of 55.5 gr = stater of 888 gr) is late-fifth or early-fourth century; cf. LW 40, and the two fourth-century weights which are explicitly defined as fractions of a 210-dr stater (above, 117). See below, n.52.

47 Decree of 403: Andoc. 1.83; 'Standards' decree: Figueira 1998; Hitzl 1996: 136–8.

48 Decree of 374/3: RO 26, noting the inaccuracy of measuring by volume (pp.124–5). It has been suggested that larger weights offered an incentive to traders, who would get more for their money (Hitzl 1996: 136), but this would only work if prices were fixed, of which there is no sign.

49 Property thresholds and their implications: van Wees 2006; Raaflaub 2006.

50 A Delphic *medimnos* was 8/5th of a Pheidonian (RO 45, col. ii.1–4); a Laconian *medimnos* was 10/7th of an Attic (Plut. *Lyc.* 12.2 with Athen. 141c; see Hodkinson 2000: 191–2). Both Delphi and Sparta probably (but not certainly) used Aeginetan measures, just as they used Aeginetan coinage: if so, the Attic *medimnos* was 56/50th of its Pheidonian equivalent, i.e 12 per cent larger.

51 Athenian double stater and hemistater: see n.3, above. Quarter-stater: Pernice 1894: no. 730, from Piraeus – but Pernice does not regard it as archaic. Twelfth-staters: Pernice 1894: no. 4; Lang 1964: BW 5; cf. Hitzl 1996: 111–12.

52 Pre-450 deposit: Hitzl 1996: 97–101. Hitzl's theory that a 220-dr standard replaced the 200-dr and 210 dr standards in the late fifth century at Olympia (1996: esp. 133–41) does not work for Athens: Lang's fourth-century weights LW 6, 29 and 47 (above, n.3) as well as LW 46 (one-eighth, 108 gr), 91 (429.5 gr, i.e. half a stater?) and 95 (280.5 gr, i.e. a third?) all fit the 200-dr standard better than any other.

53 See n.3, above: BW 1, 2 and 3. The weights cited here are those given by Lang 1964; the original brief excavation report (*Hesperia* 7 [1938] 362) gave 810 gr for the stater, 199.5 gr for the quarter (798-gr stater), and 127.5 gr for the sixth (765-gr stater).

54 Analysis of contents of well (D 15:1): Shear 1993: 434–5; the earliest pieces, 525–500 BC, are: Sparkes et al. 1970: nos 1391, 1407; Moore et al. 1986: nos 205, 517; *skyphos* P 11036; dish P 11037; *askos* P 11054; *lekane* P 10671.

55 'Star'-weights: Hitzl 1996: 63–5; their shape is in fact nearly triangular and very similar to the later 'quarter-minas' (eighth-staters) found at Olympia.

56 Fines in FF 32–3 R (5 dr), 30 (20 dr), 26 and 65 (100 dr); cf. F 92 (rewards of 1 and 5 dr for killing wolves), 143a (100 and 500 dr for athletic champions), 81 (cost of sacrificial victims, implicitly in drachmas); discussion: Kroll 1998: 225–7.

57 Plut. *Sol*. 23.3. Unlike the equivalence of a sheep and 1 dr (above, p.89), this equivalence was not made explicit in a Solonian law but somehow inferred by Demetrius (perhaps in *On Lawgiving in Athens*: Diog. Laert. 5.80). It is unlikely that Demetrius inferred from Solon's bounty of 5 dr for killing a wolf that this was 'the price of the animals likely to have been attacked' (*pace* Schaps 2004: 239).

58 This would explain why the values of sacrificial animals stipulated elsewhere in Solon's laws were 'much higher', according to Plutarch (*Sol*. 23.3), and it would be in keeping with the tradition about Solon's laws being mild (e.g. Plut. *Sol*. 17).

59 But Schaps 2001: 97–9; 2004: 89–90, argues that silver was used in external relations while iron spits served as currency within Attica; see also next note.

60 Lysias 10.18 (Solon F 68 R), with Kroll 1998: 228–9; 2001: 78–81. Schaps' different interpretation of the word στάσιμον in this law (2001: 97–8) does not affect the implication that silver was widely used in transactions within Attica.

61 So already Rhodes 1981: 168. Cf. Kroll 1998; Kim 2001: 13–19 (noting on p.15 the presence of much uncoined silver along silver coins in archaic hoards); Kim and Kroll 2008: 57–8 (the Colophon hoard, *CH* 1.3, has 318 gr of uncoined and 265 gr of coined silver).

62 I owe the suggestion to Peter van Alfen.

63 As suggested also by Kraay 1976: 314; Nicolet-Pierre 2002: 106.

64 Lydia: Xenophanes fr. 4 W; Herodotus 1.94.1; cf. Nicolet-Pierre 2002: 72–3; at 117–18 she opts for a date *c.* 600 BC. Short survey of views on date: Schaps 2004: 95–6.

65 See esp. Kroll and Waggoner 1984: 333–9 (Aegina *c.* 575; Corinth 560; Athens soon after 550); Price and Waggoner 1975: 68 (Athens '545 or later'), 69–79 (Aegina and Corinth *c.* 550 BC); Nicolet-Pierre 2002: 137, 143 (Aegina and Corinth *c.* 525).

66 Root 1988; cf. Flament 2007: 37 (from Group L [Seltman] = III [Kroll/Waggoner]).

67 Hoard evidence: Flament 2007: 155–75; cf. Kroll and Waggoner 1984: 328. Owls are absent from hoards *IGCH* 2 (525–515?), 3 (530–510?) and 5 (520–500?).

68 Range: Kroll and Waggoner 1984: 334. No. of obverse dies: 14 and 15 for the two earliest groups (H, L Seltman = II, III Kroll and Waggoner): Flament 2007: 38. Date of 525 BC: Kraay 1956; 1976: 61–3; Kroll 1981: 15; Kroll and Waggoner 1984: 330.

69 A minimum of 124 dies for Groups C/G/M Seltman = IV Kroll and Waggoner; 31 for Group F (= V) and 28 for Group E (= VI): Flament 2007: 36–41.

70 Wallace 1962; Price and Waggoner 1975: 64–5; Dawson 1999; Trevett 2001: 26–7.

71 Seltman 1924: 76; pl. XXII, π. I am obliged to Peter van Alfen for crucial advice here. For a date of *c.* 515 BC, see e.g. Flament 2007: 27–8; Picard 2001: 8.

72 Cf. Kraay 1976: 59; Seltman 1924: 77. Other views on Hippias' currency: Price and Waggoner 1975: 65 (Gorgon tetradrachms); Dawson 1999: 73–4 (Gorgon didrachms); Kraay 1976: 59 notes but rejects the possibility of repeated demonetization of types of heraldic coins, which would have been hard to enforce. Attic hoards with heraldic coins only: *IGCH* 2 (Athens), 5 (Eleusis). Hoard with Owls only: *IGCH* 14 (Sounion). Hoard with Owls and 'wheels': *IGCH* 12 (Acropolis). Outside Attica (where Hippias' laws obviously had no force) some hoards also have only heraldic coins (*IGCH* 3; 1165; 1639) but others combine these with Owls (*IGCH* 9, 10, 1640, 1644, 1874).

73 Horse facing left (1 obverse die); forepart of horse facing right (7 dies); forepart of horse facing left (4 dies); hindquarters of horse facing right (2 dies): 14 dies in all, outnumbering the total of 11 dies for all other types, excluding Gorgons and wheels, for which see below; Flament 2007: 10–11; cf. Kroll 1981: 21–2.

74 National emblem: Kroll 1981: 16–17; larger- and smaller-denomination Gorgons simultaneously (along with a didrachm with a bull emblem): Flament 2007: 20. Kroll 1981: 22 counts 10–13 Gorgoneion didrachm dies and 6 Gorgoneion tetradrachm dies.

75 Date and origin of 'wheels': Flament 2007: 21–3, 173–5, with reference to *IGCH* 12; Flament lists a total of 13–16 obverse dies for the three types (p.11). They appear alongside Eretrian coins in *IGCH* 2, 5, 9, and

alongside (other) Chalcidian coins in *IGCH* 1644, 1874. Athens occupies Chalcis: Hdt. 5.77; 6.100–1; relation in 480: Hdt. 8.1.

76 Seltman 1924: 80–3, Pl. XIV. They are in two denominations, with a median weight of 1.35 gr and 0.67 gr respectively, very close to the ideal weights of a Phocaic twelfth-stater (1.37 gr) and twenty-fourth stater (0.68 gr). Seltman (ibid.) also lists 4 specimens of a coin of mixed silver and electrum, weighing 7.05–7.20 gr.

77 Cf. Kroll 1981: 21–3; Kroll and Waggoner 1984: 332, who, however, include wheels. For the number of dies, see also Flament 2007: 11–12 (not including fractions).

78 See above, Ch. 5, p.102, for changes in Hippias' access to silver mines in 512 which help explain why the Owls, unlike earlier coins, used exclusively silver from Laurion.

79 Kroll 1981: 26–30; Flament 2007: 38–9: this is Kroll's Group III, Seltman's Group L.

80 So Kraay 1976: 66–7.

81 See esp. De Callataÿ 1995: 296–302 (30,000); also on the epigraphic evidence Kinns 1983: esp. 18–19 (30,000), with Ashton 2001: 97 n.94 (15,000), and Sellwood 1963 for experiments (15,000; cf. Kraay 1976: 14). All such estimates are categorically rejected by Buttrey and Buttrey 1997: 129–35.

82 Kroll 1984: 329 counts 15 dies in the second group of Owls; Kroll and Waggoner 1984: 329 count 124 dies in their Group IV (Seltman's C, G and M), but suspect that there may be as many as 200; 31 in their Group V (Seltman's F); 28 in Group VI (Seltman's E). Raven 1968: 47 n.2 estimates that Athens struck 600–1,200 talents' worth of Owls annually throughout the 480s.

83 See above, p.98 (tax), p.81 (dole). Cf. a fine of 'up to 3 obols': *IG* I^3 4 B.12–13.

84 Hoard: *CH* 1.3; fully published in Kim and Kroll 2008; cf. Kim 2001; 2002, drawing out the implications. The Greeks themselves evidently regarded retail trade as something distinctive to their own culture (Hdt. 1.153.1–2: Cyrus' criticism of Greeks as 'people who deceive one another' in the agora), shared only by its inventors, the Lydians, who also invented coinage (Hdt. 1.94.1).

85 The significance of public pay has often been stressed to the exclusion of retail and other trade (e.g. Cook 1958; Kraay 1976: 318; Martin 1996). Conversely, van Wees 2009: 461–2, stressed the role of retail trade to the exclusion of public payments.

86 Inscribed names: e.g. Kraay 1976: 23–4; Nicolet-Pierre 2002: 120–1. Variable value of electrum: e.g. Keyser and Clark 2001; Wallace 2001. If the identification of a single coin as 1/192nd, rather than 1/96th, of stater is correct (Konuk 2003: 33), this coin would still be worth as much as one Attic obol and rather large for use in retail trade.

87 Kraay 1976: 29; Wallace 2001: 131.

88 See e.g. Kraay 1976: 80, 318–19, for early electrum and Corinthian silver.

89 Contra e.g. Kraay 1976: 63; Kroll 1981: 15. In the Levant, a hoard of *c.* 500–490 BC (*IGCH* 1479, Djeble) exceptionally contains 12 Owls out of 16 coins (cf. *CH* 6.4 of *c.* 480 BC), but elsewhere we must wait until the 480s: in the West, a hoard from Tarentum of *c.* 490 BC, contains only 4–5 Owls and 2 *Wappenmünzen* among *c.* 600 coins from a very wide range of cities (*IGCH* 1874, see Price and Waggoner 1975: 63), but in Sicily two hoards of *c.* 490–480 BC do have large numbers of Owls (*IGCH* 2065–6, Messina and Gela). In the Aegean and Asia Minor, we find only one or two coins each in several hoards (*IGCH* 1165, 1172, 1173) until 480–475 BC (1177, Cilicia/Pamphylia). In Egypt, several large hoards have only 3–5 Owls each and a few *Wappenmünzen* (*IGCH* 1638–40; *CH* 1.7) until *c.* 475–470 (*IGCH* 1644–5, Asyut, Zagazig).

90 Above, nn.22–3, with particular reference to *Od.* 22.55–9. For the view that coinage broke down social and cultural boundaries, see Kurke 1999; Seaford 2004.

91 Cf. Crawford 1986: 10 (invention of coinage 'una tapa relativamente banale').

92 *IG* XII 9.1273 and 1274, as restored by Cairns 1983. The law is relevant regardless of whether the χρέματα here are coins or other kinds of valuable, as Cairns argues.

93 Barron 1966: 17–18; Kraay 1976: 29–30; the issue was noted, but (no doubt deliberately) misrepresented in a story reported by Hdt. 3.56.2.

Chapter 7: Conclusion

1 Xenophon, *Anab.* 7.1.27 reports a total income of 1,000 talents; Thuc. 2.13.3 reports that 600 talents derived from the tribute and allied territories.

2 See Körner 1995: 398–401; Ormrod 1995: 138–56.

3 This is first attested in the attempt by Alcaeus and his fellow-exiles to reconquer Mytilene, *c.* 600 BC, funded by Lydia to the tune of 2,000 staters, i.e. 28.6 kg of electrum, equivalent in value to 286 kg or 11 talents of silver: Alcaeus fr. 69 L–P.
4 See van Wees 1999 and 2008 for this interpretation of archaic Greece.

Appendix

1 Contra Wallinga 1993: 118–29, 133–5, who argues that all ships were in Persian hands and speculates that the Ionians seized 300 triremes stationed at a Persian naval base; and Scott 2005: 205, 479–81, who suggests that the ships may have been stationed in Greek cities, but were nevertheless subject to direct Persian control.
2 *Samaina*: see above, Ch. 2, n.49. Wallinga 1993; 99, 117, by contrast, suggests that Polycrates owed his triremes to Egypt, but requires complex scenarios to account for their late appearance in his reign and their use against Egypt.
3 Cawkwell's argument (2005: 255–73) that the Persians never intervened politically or financially but simply let their subjects maintain as many or few triremes as they chose, except in Phoenicia, does not satisfactorily explain the evidence of Diodorus 11.3.7, the large numbers of triremes in Ionia by 494, or why the reasons for Persian intervention in Phoenician ship-building did not equally apply to Ionia.

Bibliography

Ahlberg, G., *Fighting on Land and Sea in Greek Geometric Art* (Stockholm, 1971)

Alberti, M.E., 'Changing in time: some aspects of the Aegean and Cypriot balance weights', in Alberti et al. (eds) 2006, 315–40

Alberti, M.E. et al. (eds), *Weights in Context: Bronze Age weighing systems of the Eastern Mediterranean* (Rome, 2006)

Alfen, P., van (ed.), *Agoranomia: Studies in money and exchange presented to John H. Kroll* (New York, 2006)

Alfen, P., van, 'Financing a late-sixth-century B.C. Greek fleet: a reassessment of Polykrates and his *thalassocracy*', forthcoming

Amit, M., *Athens and the Sea: A study in Athenian sea power* (Brussels, 1965)

Anderson, G., 'Alkmeonid "homelands", political exile and the unification of Attica', *Historia* 49 (2000), 387–412

Anderson, G., *The Athenian Experiment: Building an imagined political community in ancient Attica, 508–490 BC* (Ann Arbor, MI, 2003)

Andreades, A.M., 'Les finances de l'état homérique', *REG* 28 (1915), 377–416

Andreades, A.M., *A History of Greek Public Finance*, vol. I (Cambridge, MA, 1933)

Andrewes, A., 'The growth of the Athenian state', in J. Boardman and N.G.L. Hammond (eds), *The Cambridge Ancient History*. Second edition (Cambridge, 1982), 360–91

Aperghis, G.G., 'Athenian mines, coins and triremes', *Historia* 62 (2013), 1–24

Aravantinos, V.L. and M.E. Alberti, 'The balance weights from the Kadmeia, Thebes', in Alberti et al. (eds) 2006, 293–313

Ascalone, E., 'Tell Es-Sultan-Jericho weight systems: new evidences of weights from Inner Palestine during the Early and Middle Bronze Age', in Alberti et al. (eds) 2006, 161–83

Ascalone, E. and L. Peyronel, 'Balance weights from Tell Mardikh-Ebla and the weighing systems in the Levant in the Middle Bronze Age', in Alberti et al. (eds) 2006, 127–60

Ashton, R., 'The coinage of Rhodes, 408–*c.* 190 BC, in Meadows and Shipton (eds) 2001, 79–115

Bakhuizen, C., '*Nautai* en *aeinautai*', in *Van Landrotten en Zeeschuimers: opstellen aangeboden aan H.T. Wallinga. Utrechtse Historische Cahiers* 11 (1990), 13–17

Balmuth, M. (ed.), *Hacksilber to Coinage: New insights into the monetary history of the Near East and Greece* (New York, 2001)

Bannerman, J., *Studies in the History of Dalriada* (Edinburgh and London, 1974)

Barron, J.P., *The Silver Coins of Samos* (London, 1966)

Beloch, K.J., 'Das Volksvermögen von Attika', *Hermes* 20 (1885), 237–61

Beloch, K.J., *Griechische Geschichte,* vol. I.2. Second edition (Strassburg, 1913)

Berent, M., 'Anthropology and the classics: war, violence and the stateless *polis*', *CQ* 50 (2000), 257–89

Best, J., *Thracian Peltasts and their Influence on Greek Warfare* (Groningen, 1968)

Bettalli, M., *I mercenari nel mondo Greco. Dalle origini alla fine del V sec. a. C.* (Pisa, 1995)

Billigmeier, J.-C. and A.S. Dusing, 'The origin and function of the *naukraroi* at Athens: an etymological and historical explanation', *TAPA* 111 (1981), 11–16

Bissa, E.M.A, *Governmental Intervention in Foreign Trade in Archaic and Classical Greece* (Leiden and Boston, 2009)

Blok, J.H. and A.P.M.H. Lardinois (eds), *Solon of Athens: New historical and philological approaches* (Leiden, 2006)

Boeckh, A., *Die Staatshaushaltung der Athener. Erster Band*. Third edition (Berlin, 1886; reprinted Cambridge, 2010)

Boersma, J., *Athenian Building Policy from 561–560 to 404–403 BC* (Groningen, 1970)

Boersma, J., 'Peisistratos' building activity reconsidered', in Sancisi-Weerdenburg (ed.) 2000, 49–56

Bonner, R.J. and G. Smith, *The Administration of Justice from Homer to Aristotle* (Chicago, 1930)

Bonney, R., 'The eighteenth century II: the struggle for Great Power status and the end of the old fiscal regime', in Bonney (ed.) 1995, 315–90

Bonney, R. (ed.), *Economic Systems and State Finance* (Oxford, 1995)

Bonney, R. (ed.), *The Rise of the Fiscal State in Europe, c. 1200–1815* (Oxford, 1999)

Bonney, R. and W.M. Ormrod, 'Crises, revolutions and self-sustained growth: towards a conceptual model of change in fiscal history', in Ormrod, Bonney and Bonney (eds) 1999, 1–21

Bremmer, J., 'Oorsprong, functie en verval van de pentekonter', in *Van Landrotten en Zeeschuimers: opstellen aangeboden aan H.T. Wallinga. Utrechtse Historische Cahiers* 11 (1990), 1–11

Bresson, A., *La cité marchande* (Bordeaux, 2000)

Bruijn, J.R., 'States and their navies from the late sixteenth to the end of the eighteenth century', in P. Contamine (ed.), *War and Competition between States* (Oxford, 2000), 69–98

Brun, P., *Eisphora-Syntaxis-Stratiotika. Recherches sur les finances militaires d'Athènes au IVe siècle av. J.-C.* (Paris, 1983)

Bugh, G.R., *The Horsemen of Athens* (Princeton, NJ, 1988)

Burrer, F., 'Sold und Verpflegungsgeld in klassischer und hellenistischer Zeit', in F. Burrer and H. Müller (eds), *Kriegskosten und Kriegsfinanzierung in der Antike* (Darmstadt, 2008), 74–90

Busolt, G., *Griechische Staatskunde, 1. Teil* (Munich, 1920)

Buttrey, S.E and T.V. Buttrey, 'Calculating ancient coin production, again', *AJN* 9 (1997), 113–35

Cairns, F., 'XPHMATA DOKIMA, *IG* XII 9, 1273 and 1274 and the early coinage of Eretria', *ZPE* 54 (1984), 144–55

Cairns, F., 'The "Laws of Eretria" (*IG* XII.9 1273 and 1274): epigraphic, historical and political aspects', *Phoenix* 45 (1991), 291–313

Callataÿ, F., de, 'Calculating ancient coin production: seeking a balance', *NC* 155 (1995), 289–311

Camp, J.M., *The Athenian Agora: Excavations in the heart of classical Athens* (London, 1986)

Camp, J.M., 'Before democracy: Alkmaionidai and Peisistratidai', in W.D.E. Coulson et al. (eds), *The Archaeology of Attica under the Democracy* (Oxford, 1994), 7–12

Carlier, P., *La royauté en Grèce avant Alexandre* (Strasbourg, 1984)

Casson, L., *Ships and Seamanship in the Ancient World*. Revised edition. (Princeton, 1995)

Cawkwell, G., *The Greek Wars: The failure of Persia* (Oxford, 2005)

Ceccarelli, P., 'Sans thalassocratie, pas de démocratie? Le rapport entre thalassocratie et démocratie à Athènes dans la discussion du Ve-IVe siècle', *Historia* 42 (1993), 444–70

Chadwick, J., *The Mycenaean World* (Cambridge, 1976)

Chantraine, P., *Dictionnaire étymologique de la langue grecque: histoire des mots*, vols I–IV (Paris, 1968–80)

Christ, M., 'Conscription of hoplites in classical Athens', *CQ* 51 (2001), 398–422

Christ, M., *The Bad Citizen in Classical Athens* (Cambridge, 2006)

Christ, M., 'The evolution of the *eisphora* in classical Athens', *CQ* 57 (2007), 53–69

Christiansen, E., *The Norsemen in the Viking Age* (Malden, 2002)

Clairmont, C., *Patrios Nomos: Public burial in Athens during the fifth and fourth centuries BC* (Oxford, 1983)

Cohen, E.E., *The Athenian Nation* (Princeton, NJ, 2000)

Conophagos, C.E., *Le Laurium antique et la technique grecque de la production de l'argent* (Athens, 1980)

Constantakopoulou, C., *The Dance of the Islands* (Oxford, 2007)

Cook, R.M., 'Speculations on the origins of coinage', *Historia* 7 (1958), 257–62

Courbin, P., 'Dans la Grèce archaique: valeur comparée du fer et de l'argent lors de l'introduction du monnayage', *Annales: Économies- Sociétés-Civilisations* 14 (1959), 209–33

Crawford, M.H., 'Solon's alleged reform of weights and measures', *Eirene* 10 (1972), 5–8

Crawford, M.H., *La moneta in Grecia e a Roman* (Bari, 1986)

Davies, J.K., *Wealth and the Power of Wealth in Classical Athens* (Salem, 1984)

Davies, J.K., 'Temples, credit and the circulation of money', in Meadows and Shipton 2001, 117–28

Davies, J.K., 'Classical Greece: production', in Scheidel et al. (eds) 2007, 333–61

Dawson, S., 'The Athenian *Wappenmünzen*', *Scholia* 8 (1999), 71–8

Descat, R., 'De l'économie tributaire à l'économie civique: le rôle de Solon', in M.-M. Mactoux and E. Geny (eds), *Mélanges Pierre Lévêque, 5: anthropologie et société* (Besançon, 1990), 85–100

Donlan, W., 'Homeric *temenos* and the land economy of the Dark Age', *MH* 46 (1989), 129–45

Effenterre, H., van, 'Clisthène et les mesures de mobilisation', *REG* 89 (1976), 1–17

Effenterre, H., van, 'Réflexions sur la fiscalité dans la Grèce des cités archaïques', in id. (ed.), *Points de vue sur la fiscalité antique* (Paris, 1979), 19–30

Elayi, J. and A.G. Elayi, *Recherches sur les poids phéniciens. Transeuphratène* supplement 5 (Paris, 1997)

Fagan, G.G. and M. Trundle (eds), *New Perspectives on Ancient Warfare* (Leiden and Boston, 2010)

Faraguna, M., 'Individuo, stato e comunità. Studi recenti sulla polis', *Dike* 3 (2000), 217–29

Figueira, T.J., 'Xanthippos, the father of Pericles, and the *prytaneis* of the *naukraroi*', *Historia* 35 (1986) 257–79 (revised version in Figueira 1993, 151–72)

Figueira, T.J., *Excursions in Epichoric History: Aiginetan essays* (Lanham, 1993)

Figueira, T.J., *The Power of Money: Coinage and Politics in the Athenian Empire* (Philadelphia, 1998)

Figueira, T.J., 'Khalkis and Marathon', in K. Buraselis and K. Meidani (eds), *Marathon: The battle and the ancient deme* (Athens, 2010), 185–202

Figueira, T.J., 'The Athenian *naukraroi* and archaic naval warfare', *Cadmo* 21 (2011), 183–210

Finley, M.I., *The Ancient Economy* (London, 1973; revised ed. 1985)

Finley, M.I., *The World of Odysseus* (London, 1978)

Finley, M.I., *Economy and Society in Ancient Greece* (Harmondsworth, 1981)

Finley, M.I., *Politics in the Ancient World* (Cambridge, 1983)

Fisher, N., *Hybris: A study in the values of guilt and shame in ancient Greece* (Warminster, 1992)

Flament, C., *Le monnayage en argent d'Athènes. De l'époque archaïque à l'époque hellénistique (c. 550 – c. 40 av. J.-C.)* (Louvain-la-Neuve, 2007)

Fornara, C.W., *The Nature of History in Ancient Greece and Rome* (Berkeley, 1983)

Foxhall, L., 'A view from the top: evaluating the Solonian property classes', in Mitchell and Rhodes 1997, 39–48

Foxhall, L. and H. Forbes, '*Sitometreia*: the role of grain as a staple food in classical antiquity', *Chrion* 12 (1982), 49–90

Francotte, H., *Les finances des cités grecques* (Liège and Paris, 1909)

Fried, M.H., *The evolution of political society: An essay in political anthropology* (New York, 1967)

Frisk, H., *Griechisches etymologisches Wörterbuch* (Heidelberg, 1960–70)

Frost, F., 'The Athenian military before Cleisthenes', *Historia* 33 (1984), 283–94

Frost, F., *Politics and the Athenians: Essays on Athenian history and historiography* (Toronto, 2005)

Gabrielsen, V., 'The *naukrariai* and the Athenian navy', *C&M* 36 (1985), 21–51

Gabrielsen, V., *Financing the Athenian Fleet* (Baltimore, 1994)

Gabrielsen, V., 'The impact of armed forces on government and politics in archaic and classical Greek *poleis*: a response to Hans van Wees', in A. Chaniotis and P. Ducrey (eds), *Army and Power in the Ancient World* (Stuttgart, 2002), 83–98

Gabrielsen, V., 'Warfare and the state', in P. Sabin et al. (eds) 2007, 248–72

Gale, N.H., W. Gentner and G.A. Wagner, 'Mineralogical and geographical silver sources of archaic Greek coinage', in D.M. Metcalf (ed.), *Metallurgy in Numismatics I* (London, 1980), 3–50

Garnsey, P., *Famine and Food Supply in the Greco–Roman World* (Cambridge, 1988)

Gellner, E., *Nations and Nationalism* (Oxford, 1983)

Graham, A.J., *Colony and Mother City in Ancient Greece* (Manchester, 1964)

Gray, D., *Seewesen. Archaeologia Homerica G* (Göttingen, 1974)

Greene, E.S., M.L. Lawall and M.E. Polzer, 'Inconspicuous consumption: the sixth-century BC shipwreck at Pabuç Burnu, Turkey', *AJA* 112 (2008), 685–711

Greene, E.S., J. Leidwanger and H.A. Özdaş, 'Two early archaic shipwrecks at Kekova Adası and Kepçe Burnu, Turkey', *IJNA* 40.1 (2010), 60–8

Griffith, J.G., 'A note on the first *eisphora* at Athens', *AJAH* 2 (1977), 3–7

Guarducci, M., 'Tripodi, lebeti, oboli', *Rivista di filologia classica* 22/3 (1945), 171–80

Haas, C.J., 'Athenian naval power before Themistocles', *Historia* 34 (1985), 29–46

Hale, J., *Lords of the Sea: The epic story of the Athenian navy and the birth of democracy* (New York, 2009)

Hansen, M.H., *Demography and Democracy: The number of Athenian citizens in the fourth century* (Herning, 1985)

Hansen, M.H., 'Was the polis a state or a stateless society?', in T.H. Nielsen (ed.), *Even More Studies in the Ancient Greek Polis. Historia Einzelschriften* 162 (Stuttgart, 2002), 17–47

Hansen, M.H. and T. Fischer-Hansen, 'Monumental political architecture in archaic and classical Greek poleis', in D. Whitehead (ed.), *From Political Architecture to Stephanus Byzantius: Sources for the ancient Greek polis* (Stuttgart, 1994), 23–90

Hansen, M.H. and T.H. Nielsen (eds), *An Inventory of Archaic and Classical Poleis* (Oxford, 2004)

Hanson, V.D., *The Other Greeks: The family farm and the agrarian roots of western civilization* (New York, 1995)

Harding, P., *Androtion and the* Atthis (Oxford, 1994)

Harris, E.M., 'A new solution to the riddle of the *seisachtheia*', in Mitchell and Rhodes (eds) 1997, 103–12

Hasebroek, J., *Trade and Politics in Ancient Greece* (London, 1933)

Heath, M., *Menander: A rhetor in context* (Oxford, 2004)

Heichelheim, F.M., *An Ancient Economic History*, vol. II (Leiden, 1964)

Herman, G., *Morality and Behaviour in Democratic Athens* (Cambridge, 2006)

Hignett, C., *History of the Athenian Constitution* (Oxford, 1952)

Hitzl, K., *Die Gewichte Griechischer Zeit aus Olympia. Olympische Forschungen Bd. XXV* (Berlin and New York, 1996)

Hocquet, J.-C., 'City-state and market economy', in Bonney (ed.) 1995, 81–100

Hocquet, J.-C., 'Venice', in Bonney (ed.) 1999, 381–415

Hodkinson, S., *Property and Wealth in Classical Sparta* (London and Swansea, 2000)

Hoffmann, P.T. and K. Norberg (eds), *Fiscal Crises, Liberty and Representative Government, 1450–1789* (Stanford, 1994)

Hollister, C.W., *Anglo–Saxon Military Institutions on the Eve of the Norman Conquest* (Oxford, 1962)

Hornblower, S., *A Commentary on Thucydides*, vol. I (Oxford, 1991)

Hornblower, S., *A Commentary on Thucydides*, vol. III (Oxford, 2009)

Hoyos, D., *The Carthaginians* (London and New York, 2010)

Humphreys, S.C., *Anthropology and the Greeks* (London, 1978)

Humphreys, S.C., *The Strangeness of Gods* (Oxford, 2004)

Hunter, V.J., *Policing Athens: Social control in the Attic lawsuits, 420–320 BC* (Princeton, NJ, 1994)

Irwin, E., 'Herodotus and Samos: personal or political?', *Classical World* 102 (2009), 395–416

Irwin, E., 'Herodotus on Aeginetan identity', in D. Fearn (ed.), *Aegina: Contexts for choral lyric poetry* (Oxford, 2011), 373–425

Jackson, A., 'Sea-raiding in archaic Greece with special attention to Samos', in Oliver et al. (eds) 2000, 133–49

Jeffery, L. and A. Morpurgo-Davies, 'ΠΟΙΝΙΚΑΣΤΑΣ and ΠΟΙΝΙΚΑΖΕΝ: BM 1969.4–2.1, a new archaic inscription from Crete', *Kadmos* 9 (1970), 118–54

Jones, A.H.M., *Athenian Democracy* (Baltimore, 1957)

Jordan, B., *The Athenian Navy in the Classical Period* (Berkeley, 1975)

Jordan, B., *Servants of the Gods: A study in the history, religion and literature of fifth-century Athens* (Göttingen, 1979)

Jordan, B., 'The *naukraroi* of Athens and the meaning of NEMΩ', *L'Antiquité Classique* 61 (1992), 60–79

Kahrstedt, U., *Staatsgebiet und Staatsangehörige in Athen. 1. Teil* (Stuttgart and Berlin, 1934)

Kallet, L., '*Demos tyrannos*: wealth, power and economic patronage', in K. Morgan (ed.), *Popular Tyranny. Sovereignty and its discontents in ancient Greece* (Austin, TX, 2003), 117–53

Kallet-Marx, L., *Money, expense and naval power in Thucydides' History* 1–5.24 (Berkeley, 1993)

Keil, B., *Anonymus Argentensis* (Strassburg, 1902)

Keyser, P.T. and D.D. Clark, 'Analysing and interpreting the metallurgy of early electrum coins', in Balmuth (ed.) 2001, 105–26

Kienast, D., 'Die Funktion der attischen Demen von Solon bis Kleisthenes', *Chiron* 35 (2005), 69–100

Kim, H.S., 'Archaic coinage as evidence for the use of money', in A. Meadows and K. Shipton (eds) 2001, 7–21

Kim, H.S., 'Small change and the moneyed economy', in P. Cartledge et al. (eds), *Money, Labour and Land: Approaches to the economies of ancient Greece* (London, 2002), 44–51

Kim, H. and J.H. Kroll, 'A hoard of archaic coins of Colophon and unminted silver (*CH* 1.3)', *AJN* 20 (2008), 53–103

Kinns, P., 'The Amphictionic coinage reconsidered', *NC* 143 (1983), 1–22

Körner, M., 'Expenditure', in Bonney (ed.) 1995, 393–422

Konuk, K., *From Kroisos to Karia: Early Anatolian coins from the Muharrem Kayhan collection* (Istanbul, 2003)

Kraay, C.M., 'The archaic Owls of Athens: classification and chronology', *NC* 6 (1956), 43–68

Kraay, C.M., *The Composition of Greek Silver Coins: Analysis by neutron activation* (with V.M. Emeleus, Oxford, 1962)

Kraay, C.M., 'An interpretation of *Athenaion Politeia*, chapter 10', in Kraay and Jenkins (eds) 1968, 1–9

Kraay, C.M., *Archaic and Classical Greek Coins* (London, 1976)

Kraay, C.M. and G.K. Jenkins (eds), *Essays in Greek Coinage presented to Stanley Robinson* (Oxford, 1968)

Kraft, K., 'Zur solonischen Gewichts- und Münzreform', *Jahrbuch für Numismatik und Geldgeschichte* 19 (1969), 7–24

Krentz, P., *The Battle of Marathon* (New Haven and London, 2010)

Kroll, J.H., 'Three inscribed Athenian bronze weights', in D. Mitten et al. (eds), *Studies Presented to George M.A. Hanfmann* (Cambridge, MA, 1971), 87–93

Kroll, J.H., 'From Wappenmünzen to Gorgoneia to Owls', *American Numismatic Society Museum Notes 26* (1981), 1–32

Kroll, J.H., 'Silver in Solon's laws', in R. Ashton and S. Hurter (eds), *Studies in Greek Numismatics in Memory of M.J. Price* (London, 1998), 225–32

Kroll, J.H., 'Observations on monetary instruments in pre-coinage Greece', in Balmuth (ed.) 2001, 77–91

Kroll, J.H., 'Early Iron Age balance weights at Lefkandi, Euboea', *OJA* 27 (2008), 37–48

Kroll, J.H. and N.M. Waggoner, 'Dating the earliest coins of Athens, Corinth and Aegina', *AJA* 88 (1984), 325–40

Kurke, L., *Coins, Bodies, Games and Gold: The politics of meaning in archaic Greece* (Princeton, NJ, 1999)

Kurke, L., 'Money and mythic history: the contestation of transactional orders in the fifth century BC', in Scheidel and Von Reden (eds) 2002, 87–113

Labarbe, J., *La loi navale de Thémistocle* (Paris, 1957)

Lambert, S.D., 'Herodotus, the Cylonian conspiracy and the ΠΡΥΤΑΝΙΕΣ ΤΩΝ ΝΑΥΚΡΑΡΩΝ', *Historia* 35.1 (1986), 105–12

Lambert, S.D., *The Phratries of Attica* (Ann Arbor, 1993)

Lambert, S.D., 'The sacrificial calendar of Athens', *ABSA* 97 (2002), 353–99

Lang, M., 'Weights and measures', in M. Lang and M. Crosby, *Weights, Measures and Tokens. The Athenian Agora*, vol. X (Princeton, NJ, 1964), 1–68

Latte, K., 'Kollektivbesitz und Staatsschatz in Griechenland', *Nachrichten der Akademie der Wissenschaften in Göttingen 1945/8, Phil.-hist. Klasse* 1946/7, 64–75 (= *Kleine Schriften*, Munich, 1968, 294–312)

Laum, B., *Heiliges Geld* (Tübingen, 1924)

Lavelle, B.M., 'Herodotos, Skythian archers and the *doryphoroi* of the Peisistratids', *Klio* 74 (1992), 78–97

Lavelle, B.M., '*Epikouros* and *epikouroi* in early Greek literature and history', *GRBS* 38 (1997), 229–62

Lavelle, B., *Fame, Money and Power: The rise of Peisistratos and 'democratic' tyranny at Athens* (Ann Arbor, 2005)

Le Rider, G., *La naissance de la monnaie. Pratiques monétaires de l'Orient ancien* (Paris, 2001)

Lewis, D.M., 'The tyranny of the Pisistratidae', in J. Boardman et al. (eds), *Cambridge Ancient History*, vol. IV: *Persia, Greece and the Western Mediterranean, c. 525 to 479 BC*. Second edition (Cambridge, 1988), 287–302

Lewis, D.M., 'Cleisthenes and Attica', *Historia* 12 (1963), 22–40 (= id., *Selected Papers in Greek and Near Eastern History* (Cambridge, 1997), 77–98)

Lewis, D.M., 'Democratic inscriptions and their diffusion', in *Eighth Epigraphic Congress* (1984), 55–61 (= id., *Selected Papers in Greek and Near Eastern History* (Cambridge, 1997), 51–9)

Libero, L., de, *Die archaische Tyrannis* (Stuttgart, 1996)

Lissarrague, F., *L'Autre guerrier: archers, peltastes, cavaliers dans l'imagerie Attique* (Paris and Rome, 1990)

Lloyd, A.B., 'The Saite navy', in G.J. Oliver et al. (eds) 2000, 81–91

Loomis, W., *Wages, Welfare Costs and Inflation in Classical Athens* (Ann Arbor, 1998)

Lund, N., 'If the Vikings knew a *leding* – what was it like?', in B. Ambrosiani and H. Clarke (eds), *Developments around the Baltic and the North Sea in the Viking Age. Birka Studies* 3 (Stockholm, 1994), 100–5

Lund, N., 'Is *leidang* a Nordic or European phenomenon?', in Nørgaard Jørgensen and Clausen (eds), 1997, 195–99

Luraghi, N., *Tirannidi archaiche in Sicilia e Magna Grecia* (Florence, 1994)

Luraghi, N., 'Traders, pirates, warriors: the proto-history of Greek mercenary soldiers in the Eastern Mediterranean', *Phoenix* 40 (2006), 21–47

MacDowell, D.M., 'The law of Periandros about symmories', *CQ* 36 (1986), 438–49

Manning, J.G. and I. Morris, *The Ancient Economy: Evidence and models* (Stanford, 2005)

Markle III, M.M., 'Jury pay and assembly pay at Athens', in P.A Cartledge and F.D. Harvey (eds), *CRUX. Essays in Greek history presented to G.E.M. de Ste Croix* (London, 1985), 265–97

Martin, T., 'Why did the Greek polis originally need coins?', *Historia* 45 (1996), 257–83

McInerney, J., *The Cattle of the Sun: Cows and culture in the world of the ancient Greeks* (Princeton, 2010)

Meadows, A. and K. Shipton (eds), *Money and its Uses in the Ancient Greek World* (Oxford, 2001)

Meiggs, R., *The Athenian Empire* (Oxford, 1972)

Melville-Jones, J.R., *Testimonia Numeraria, Greek and Latin Texts Concerning Ancient Greek Coinages I: Texts and Translations* (London, 1993)

Meritt, B.D., et al., *The Athenian Tribute Lists*, vols 1–4 (Cambridge, MA; Princeton, NJ, 1939–53)

Michailidou, A., 'Recording qualities of metal in Bronze Age societies in the Aegean and the Near East', in id. (ed.), *Manufacture and Measurement. Meletemata* 33 (Paris and Athens, 2001), 85–119

Migeotte, L., *The Economy of the Greek Cities from the Archaic Period to the Early Roman Empire* (Berkeley, 2009)

Millett, P., 'Finance and resources: public, private and personal', in A. Erskine (ed.), *A Companion to Ancient History* (Malden, 2010), 474–85

Mitchell, L. and P.J. Rhodes (eds), *The Development of the Polis in Archaic Greece* (London, 1997)

Möller, A., 'Classical Greece: distribution', in Scheidel et al. (eds) 2007, 362–84

Monson, A. and W. Scheidel (eds), *Fiscal regimes and the political economy of premodern states* (forthcoming)

Moore, M.B. et al., *Attic Black-Figured Pottery. Agora XXIII* (Princeton, 1986)

Moreaux, F., 'Les finances de la royauté homérique', *REG* 8 (1895), 287–320

Moreno, A., *Feeding the Democracy: The Athenian grain supply in the fifth and fourth centuries* (Oxford, 2007)

Morley, N., *Trade in Classical Antiquity* (Cambridge, 2007)

Morris, I., 'Gift and commodity in archaic Greece', *Man* 21 (1986), 1–17

Morrison, J. et al., *The Athenian Trireme*. Second edition (Cambridge, 2000)

Mussche, H.F. et al., *Thorikos 1964. Rapport préliminaire sur la deuxième campagne des fouilles* (Leuven, 1967)

Myhre, B., 'Boathouses and naval organization', in Nørgaard Jørgensen and Clausen (eds) 1997, 169–83

Naber, S.A., *Photii Patriarchae Lexicon* (Leiden, 1864)

Nagy, G., *Homer the Preclassic (*Washington, DC, 2009)

Nicolet-Pierre, H., *Numismatique grecque* (Paris, 2002)

Nicolet-Pierre, H., 'Les talents d'Homère', in van Alfen (ed.) 2006, 1–20

Nørgaard Jørgensen, A. and B. Clausen (eds), *Military Aspects of Scandinavian Society in a European Perspective,* AD *1–1300* (Copenhagen, 1997)

O'Brien, P.K. and P.A. Hunt, 'England, 1485–1815', in Bonney (ed.) 1999, 53–100

Oliver, G.J., 'The economic realities', in K.H. Kinzl (ed.), *A Companion to the Classical Greek World* (Malden, 2006), 281–310

Oliver, G.J. et al. (eds), *The Sea in Antiquity* (Oxford, 2000)

Ormrod, W.M., 'The West European monarchies in the later Middle Ages', in Bonney (ed.) 1995, 123–60

Ormrod, W.M., M. Bonney and R. Bonney (eds), *Crises, Revolutions and Self-sustained Growth: Essays in European fiscal history, 1130–1830* (Stamford, 1999)

Osborne, R., *Demos: The discovery of classical Attica* (Cambridge, 1985)

Osborne, R., 'Pots, trade and the archaic Greek economy', *Antiquity* 70 (1996), 31–44

Osborne, R., 'Archaic Greece', in Scheidel et al. (eds) 2007, 277–301

Ostwald, M., 'Public expense: whose obligation? Athens 600–454 BCE', *Proceedings of the American Philosophical Society* 139.4 (1995), 368–79

Page, D., *Sappho and Alcaeus* (Oxford, 1955)

Parke, H.W., *Festivals of the Athenians* (Cornell, 1977)

Parker, R., *Athenian Religion* (Oxford, 1996)

Pernice, E., *Griechische Gewichte* (Berlin, 1894)

Petrakos, B., 'Dédicace des AEINAYTAI d'Érétrie', *BCH* 87 (1962), 545–7

Picard, O., 'La découverte des gisements du Laurion et les débuts de la chouette', *RBN* 147 (2001), 1–10

Platon, N. and M. Feyel, 'Inventaire sacré de Thespies trouvé à Chostia (Béotie)', *BCH* 62 (1938), 149–60

Pleket, H.W., 'The archaic *tyrannis*', *Talanta* 1 (1969), 19–61

Pleket, H.W., 'Economic history of the ancient world and epigraphy: some introductory remarks', *Akten des VI. Internationalen Kongresses für griechische und lateinische Epigrafik, München 1972* (Munich, 1973), 243–59

Powell, M.A., 'Masse und Gewichte', *Reallexikon der Assyriologie und vorderasiatischen Archäologie 7* (Berlin and New York, 1990), 508–17

Price, M.J. and N. Waggoner, *Archaic Silver Coinage: The Asyut Hoard* (London, 1975)

Pritchard, D.M., 'Kleisthenes and Athenian democracy: vision from above or below?', *Polis* 22 (2005), 136–57

Pritchard, D.M., 'The symbiosis of democracy and war: the case of ancient Athens', in Pritchard (ed.) 2010, 1–62

Pritchard, D.M. (ed.), *War, Democracy and Culture in Classical Athens* (Cambridge, 2010)

Pritchett, W.K., *The Greek State at War*, vol. I (Berkeley, 1971)

Pritchett, W.K., *The Greek State at War*, vol. V (Princeton, 1991)

Raaflaub, K.A., 'The transformation of Athens in the fifth century', in D. Boedeker and K.A. Raaflaub (eds), *Democracy, Empire and the Arts in Fifth-Century Athens* (Cambridge, MA and London, 1998), 15–41

Raaflaub, K.A., 'Athenian and Spartan *Eunomia*, or: What to do with Solon's timocracy?', in Blok and Lardinois (eds) 2006, 390–428

Raaflaub, K.A., 'The breakthrough of *demokratia* in mid-fifth-century Athens', in K.A. Raaflaub et al., *Origins of Democracy in Ancient Greece* (Berkeley, 2007), 105–54

Raaflaub, K.A. and H. van Wees (eds), *A Companion to Archaic Greece* (Malden, 2009)

Rahmstorff, E., 'In search of the earliest balance weights, scales and weighing systems from the East Mediterranean, the Near and Middle East', in Alberti et al. (eds) 2006, 9–45

Raubitschek, A.E., 'The ostracism of Xanthippos', *AJA* 51 (1947), 257–62

Raven, E.J.P., 'Problems of the earliest Owls of Athens', in Kraay and Jenkins (eds) 1968, 40–58

Rawlings, L., 'The Carthaginian navy: questions and assumptions', in Fagan and Trundle (eds) 2010, 253–87

Reden, S., von, 'Money, law and exchange: coinage in the Greek *polis*', *JHS* 117 (1997), 154–76

Reed, C.M., 'Maritime traders in the archaic Greek world', *Ancient World* 10 (1984), 31–44

Reger, G., 'The economy', in A. Erskine (ed.), *A Companion to the Hellenistic World* (Malden, 2003), 331–53

Reger, G., 'Hellenistic Greece and western Asia Minor', in Scheidel et al. (eds) 2007, 460–83

Rhodes, P.J., *The Athenian Boule* (Oxford, 1972)

Rhodes, P.J., *A Commentary on the Aristotelian* Athenaion Politeia (Oxford, 1981)

Rhodes, P.J., 'Problems in Athenian *eisphora* and liturgies', *AJAH* 7 (1982), 1–19

Rhodes, P.J., 'The Athenian code of laws, 410–399', *JHS* 111 (1991), 87–100

Richardson, N., *The Iliad: A commentary*, vol. VI (Cambridge, 1993)

Ridgway, D., *The First Western Greeks* (Cambridge, 1992)

Rihll, T.E., 'The Attic *naukrariai*', *LCM* 12 (1987), 10

Robinson, E., 'The date of the earliest coins', *NC* 16 (1956), 1–8

Root, M.C., 'Evidence from Persepolis for the dating of Persian and archaic Greek coinage', *NC* 148 (1988), 1–12

Rosivach, V.J., 'The requirements for the Solonic classes in Aristotle, *AP* 7.4', *Hermes* 130 (2002a), 36–47

Rosivach, V.J., '*Zeugitai* and hoplites', *AHB* 16 (2002b), 33–43

Ruschenbusch, E., 'Die Athenischen Symmorien des 4. Jh. v. Chr.', *ZPE* 31 (1978), 275–84

Sahlins, M., *Stone Age Economics* (Chicago, 1972)

Salmon, J.B., *Wealthy Corinth: A history of the city to 338 BC* (Oxford, 1984)

Samons, L.J, II, *Empire of the Owl: Athenian Imperial Finance* (*Historia Einzelschriften* 142) (Stuttgart, 2000)

Sancisi-Weerdenburg, H., 'Solon's *hektemoroi* and Pisistratid *dekatemoroi*', in H. Sancisi-Weerdenburg et al. (eds), *De Agricultura. In memoriam P.W. de Neeve* (Amsterdam, 1993), 13–30

Sancisi-Weerdenburg, H. (ed.), *Peisistratos and the Tyranny: A reappraisal of the evidence* (Amsterdam, 2000)

Schaps, D.M., 'Builders, contractors and power', in R. Katzoff et al. (eds), *Classical Studies in Honor of David Sohlberg* (Ramat Lan, 1996), 77–89

Schaps, D.M., 'The conceptual prehistory of money and its impact on the Greek economy', in Balmuth (ed.) 2001, 93–103

Schaps, D., *The Invention of Coinage and the Monetization of Ancient Greece* (Ann Arbor, MI, 2004)

Scheidel, W. and S. von Reden (eds), *The Ancient Economy* (Edinburgh, 2002)

Scheidel, W. et al. (eds), *The Cambridge Economic History of the Greco–Roman World* (Cambridge, 2007)

Schubert, C., 'Die Naukrarien: zur Entwicklung der attischen Finanz-administration', *Historia* 57.1 (2008), 38–64

Scott, L., 'Were there polis navies in archaic Greece?', in Oliver et al. (eds) 2000, 93–115

Scott, L., *Historical Commentary on Herodotus, Book 6* (Leiden and Boston, 2005)

Seaford, R., *Money and the Early Greek Mind* (Cambridge, 2004)

Sealey, R., 'Regionalism in archaic Athens', *Historia* 9 (1960), 155–80

Sellwood, D., 'Some experiments in Greek minting technique', *NC* 3 (1963), 217–31

Seltman, C.T., *Athens: Its history and coinage before the Persian invasion* (Cambridge, 1924)

Service, E., *Origins of the State and Civilization: The process of cultural evolution* (New York, 1975)

Shear, T.L., 'The Persian destruction of Athens: evidence from Agora deposits', *Hesperia* 62.2 (1993), 383–482

Shelmerdine, C.W., 'Mycenaean society', in Y. Duhoux and A. Morpurgo-Davies (eds), *A Companion to Linear B*, vol. I (Leuven, 2008), 115–58

Shipley, G., *A History of Samos: 800–188 BC* (Oxford, 1987)

Siewert, P. et al., *Ostrakismos-Testimonien I: die Zeugnisse antiker Autoren, der Inschriften und Ostraka über das athenische Scherbengericht aus vorhellenistischer Zeit (487–322 v. Chr.)* (Stuttgart, 2002)

Singor, H.W., 'The military side of the Peisistratean tyranny', in Sancisi-Weerdenburg (ed.) 2000, 107–29

Slings, S.R., 'Literature in Athens, 566–510 BC', in H. Sancisi-Weerdenburg (ed.) 2000, 57–77

Solmsen, F., 'Ναύκραρος ναύκλαρος ναύκληρος', *RhM* 53 (1898), 151–8

Souza, P., de, 'Towards thalassocracy? Archaic Greek naval developments', in N. Fisher and H. van Wees (eds), *Archaic Greece: new approaches and new evidence* (London/Swansea, 1998), 271–93

Sparkes, B. et al., *Black and Plain Pottery of the Sixth, Fifth and Fourth Centuries BC. Part I. Agora XII* (Princeton, NJ, 1970)

Spence, I., *The Cavalry of Classical Greece* (Oxford, 1993)

Stanley, P.V., *The Economic Reforms of Solon* (St Katharinen, 1999)

Ste Croix, G.E.M., de, *Athenian Democratic Origins and Other Essays* (Oxford, 2004)

Stos-Gale, Z.A., 'The impact of the natural sciences on studies of Hacksilber and early silver coinage', in M. Balmuth (ed.) 2001, 53–76

Stos-Gale, Z.A. and N.H. Gale, 'Metal provenancing using isotopes and the Oxford archaeological lead isotope database (OXALID)', *Archaeological and Anthropological Sciences* 1 (2009), 195–213

van Straten, F.T., *Hiera Kala: Images of animal sacrifice in archaic and classical Greece* (Leiden and Boston, 1995)

Strøm, I., '*Obeloi* of pre- and proto-monetary value in the Greek sanctuaries', in T. Linders and B. Allroth (eds), *Economics of Cult in the Ancient World* (Uppsala, 1992), 41–51

Stroud, R.S., 'Greek inscriptions: Theozotides and the Athenian orphans', *Hesperia* 40 (1971), 280–301

Stroud, R.S., *The Athenian Grain-Tax Law of 374/3 BC* (Princeton, 1998)

Sullivan, B., 'Paying archaic mercenaries: views from Egypt and the Near East', *CJ* 107.1 (2011), 31–59

Tandy, D., *Warriors into Traders: The power of the market in early Greece* (Berkeley, 1997)

Thomsen, R., *Eisphora: A study of direct taxation in ancient Athens* (Copenhagen, 1964)

Tilly, C., *Coercion, Capital and European States, AD 990–1992* (Cambridge, MA, 1990; revised paperback edition 1992)

Trevett, J., 'Coinage and democracy at Athens', in Meadows and Shipton (eds) 2001, 23–34

Trundle, M., *Greek Mercenaries: From the late archaic period to Alexander* (London and New York, 2004)

Trundle, M., 'Coinage and the transformation of Greek warfare', in Fagan and Trundle (eds) 2010(a), 227–52

Trundle, M., 'Light troops in classical Athens', in Pritchard (ed.) 2010, 139–60

Unz, R.K., 'The surplus of the Athenian *phoros*', *GRBS* 26 (1985), 21–42

Valdés Guía, M. and J. Gallego, 'Athenian *zeugitai* and the Solonian census classes: new reflections and perspectives', *Historia* 59.3 (2010), 257–81

Vickers, M., 'Early Greek coinage: a reassessment', *NC* 145 (1985), 1–44

Vos, M., *Scythian Archers in Archaic Attic Vase-Painting* (Groningen, 1963)

Wade-Gery, H.T., 'Miltiades', *JHS* 71 (1951), 212–21

Walker, K.G., *Archaic Eretria: A political and social history from the earliest times to 490 BC* (London and New York, 2004)

Wallace, R., 'Remarks on the value and standards of early electrum coins', in Balmuth (ed.) 2001, 127–34

Wallace, W.P., 'The early coinages of Athens and Eretria', *NC* 2 (1962), 23–42

Wallinga, H.T., *Ships and Sea-Power before the Great Persian War* (Leiden, 1993)

Wallinga, H.T., 'The Athenian *naukraroi*', in Sancisi-Weerdenburg (ed.) 2000, 131–53

Wallinga, H.T., *Xerxes' Greek Adventure* (Leiden and Boston, 2005)

Weber, M., *Wirtschaft und Gesellschaft. Grundriss der verstehenden Soziologie. Fünfte revidierte Auflage*, ed. by J. Winckelmann (Tübingen, 1976)

Wees, H., van, *Status Warriors: War, violence and society in Homer and history* (Amsterdam, 1992)

Wees, H., van, 'Politics and the battlefield: ideology in Greek warfare', in A. Powell (ed.), *The Greek World* (London, 1995a), 153–78

Wees, H., van, 'Princes at dinner: social event and social structure in Homer', in J.P. Crielaard (ed.), *Homeric Questions* (Amsterdam, 1995b), 147–82

Wees, H., van, 'The law of gratitude: reciprocity in anthropological theory', in C. Gill et al. (eds), *Reciprocity in Ancient Greece* (Oxford, 1998a), 13–49

Wees, H., van, 'Greeks bearing arms: the state, the leisure class and the display of weapons in archaic Greece', in N. Fisher and H. van Wees (eds), *Archaic Greece: New approaches and new evidence* (London and Swansea, 1998b), 333–78

Wees, H., van, 'The mafia of early Greece: violent exploitation in the seventh and sixth centuries BC', in K. Hopwood (ed.), *Organized Crime in Antiquity* (London and Swansea, 1999), 1–51

Wees, H., van, 'The myth of the middle-class army', in T. Bekker-Nielsen and L. Hannestad (eds), *War as a Cultural and Social Force: Essays on warfare and antiquity* (Copenhagen, 2001), 45–71

Wees, H., van, 'Herodotus and the past', in E. Bakker et al. (eds), *Brill's Companion to Herodotus* (Leiden, 2002a), 321–49

Wees, H., van, 'Homer and early Greece', *Colby Quarterly* 38 (2002b), 94–117 (corrected reprint from: I. de Jong (ed.), *Homer: Critical assessments*, London, 1999, 1–32)

Wees, H., van, 'Greed, generosity and gift-exchange in early Greece and the Western Pacific', in W. Jongman and M. Kleijwegt (eds), *After the Past. Essays in ancient history in honour of H.W. Pleket* (Leiden and Boston, 2002c), 341–78

Wees, H., van, 'Conquerors and serfs: wars of conquest and forced labour in archaic Greece', in N. Luraghi and S. Alcock (eds), *Helots and their Masters in Laconia and Messenia* (Washington, DC, 2003), 33–80

Wees, H., van, *Greek Warfare: Myths and realities* (London, 2004)

Wees, H., van, 'Mass and elite in Solon's Athens: the property classes revisited', in Blok and Lardinois (eds) 2006, 351–89

Wees, H., van, '"Stasis, destroyer of men": mass, elite, political violence and security in archaic Greece', in C. Brélaz and P. Ducrey (eds), *Sécurité collective et ordre public dans les societies anciennes* (Vandoeuvres–Geneva, 2008), 1–48

Wees, H., van, 'The economy', in Raaflaub and Van Wees (eds) 2009, 444–67

Wees, H., van, '"Those who sail must receive a wage": naval warfare and finance in archaic Eretria', in Fagan and Trundle (eds) 2010, 205–26

Wees, H., van, 'Demetrius and Draco: Athens' property classes and population in and before 317 BC', *JHS* 131 (2011a), 95–114

Wees, H., van, 'The "law of hybris" and Solon's reform of justice', in S.D. Lambert (ed.), *Sociable Man: Essays on ancient Greek social behaviour, in honour of Nick Fisher* (Swansea, 2011b), 117–44

Wees, H., van, 'Farmers and hoplites: historical models', in D. Kagan and G. Viggiano (eds), *Men of Bronze: Hoplite warfare in ancient Greece* (Princeton, 2013), 222–55

Wees, H., van, *The World of Achilles* (Cambridge, forthcoming)

Whitehead, D., *The Ideology of the Athenian Metic*, *PCPhS* Supplement 4 (Cambridge, 1977)

Whitehead, D., 'The archaic Athenian *zeugitai*', *CQ* 31 (1981), 282–6

Whitehead, D., *The Demes of Attica, 508/7–c.250 BC. A political and social study* (Princeton, 1986)

Wilamowitz Moellendorf, U. von, *Aristoteles und Athen* (Berlin, 1893)

Wilcken, U., 'Zu Solons Schatzungsklassen', *Hermes* 63 (1928), 236–38

Wilhelm, A., 'Zum Ostrakismos des Xanthippos, des Vaters des Perikles', *Anzeiger Wien* 86 (1949), 237–43

Wilson, J-P., 'Literacy', in Raaflaub and van Wees (eds) 2009, 542–63

Wilson, P., *The Athenian Institution of the* Khoregia*: The chorus, the city and the stage* (Cambridge, 2000)

Wüst, F.R., 'Zu den πρυτάνιες τῶν ναυκράρων und zu den alten attischen Trittyen', *Historia* 6 (1957), 176–91

Yoffee, N., *Myths of the Archaic State: Evolution of the earliest cities, states and civilizations* (Cambridge, 2005)

Ziebarth, E., *Beiträge zur Geschichte des Seeraubs und Seehandels im alten Griechenland* (Hamburg, 1929)

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